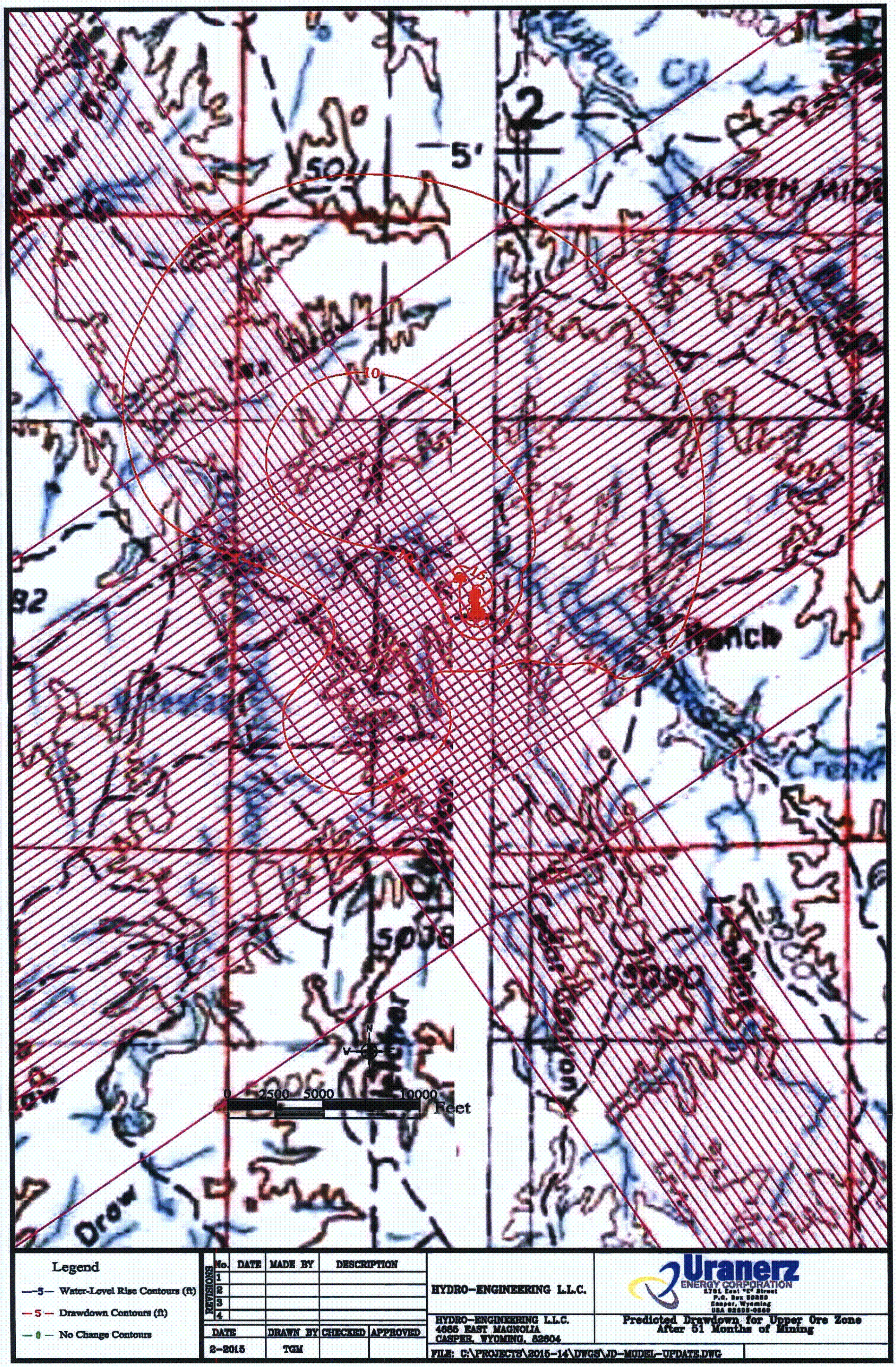

Figure MPI.1-11. Predicted Drawdown for Upper Ore Zone After 51 Months of Mining.

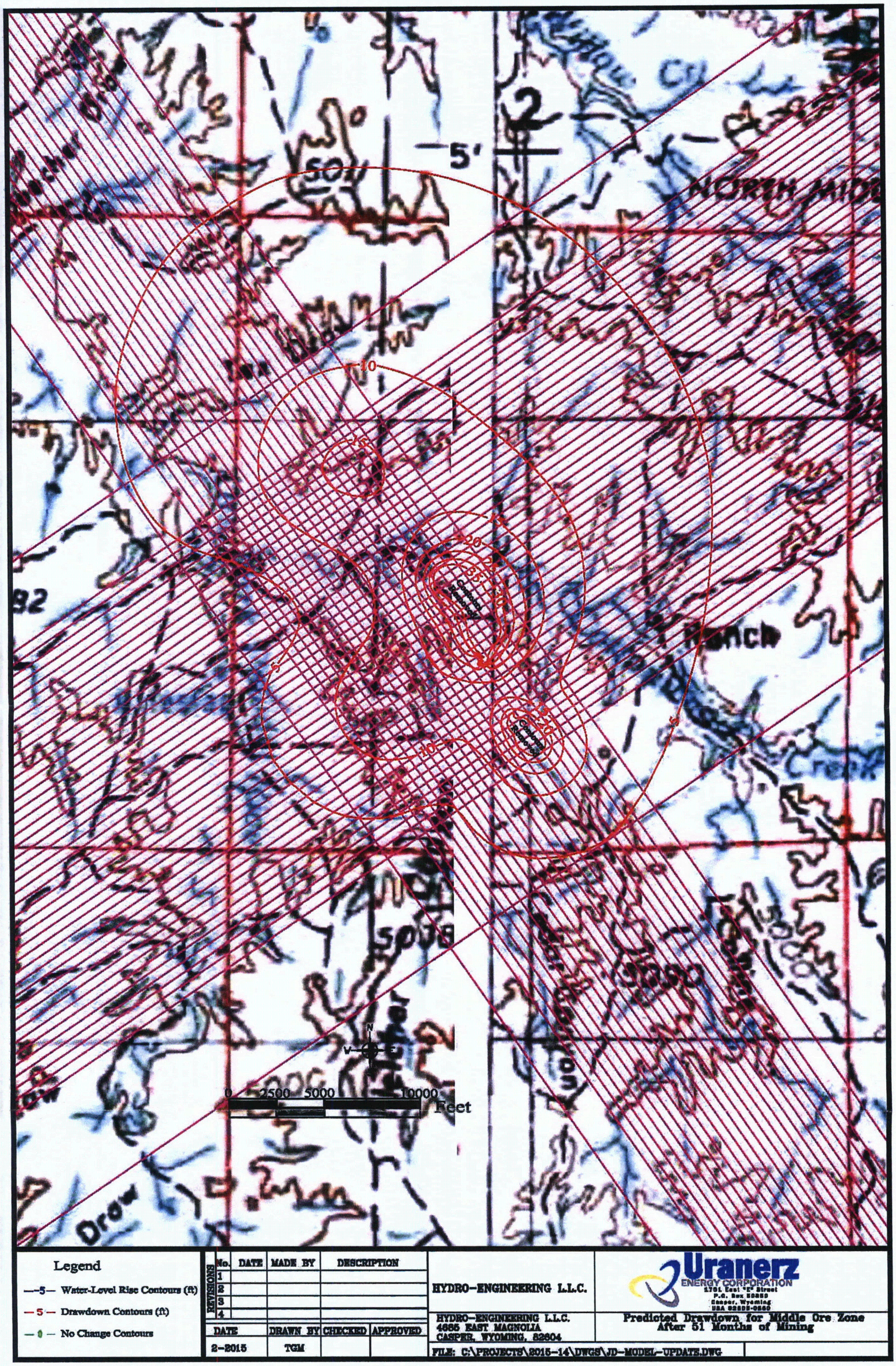

Figure MPI.1-12. Predicted Drawdown for Middle Ore Zone After 51 Months of Mining.

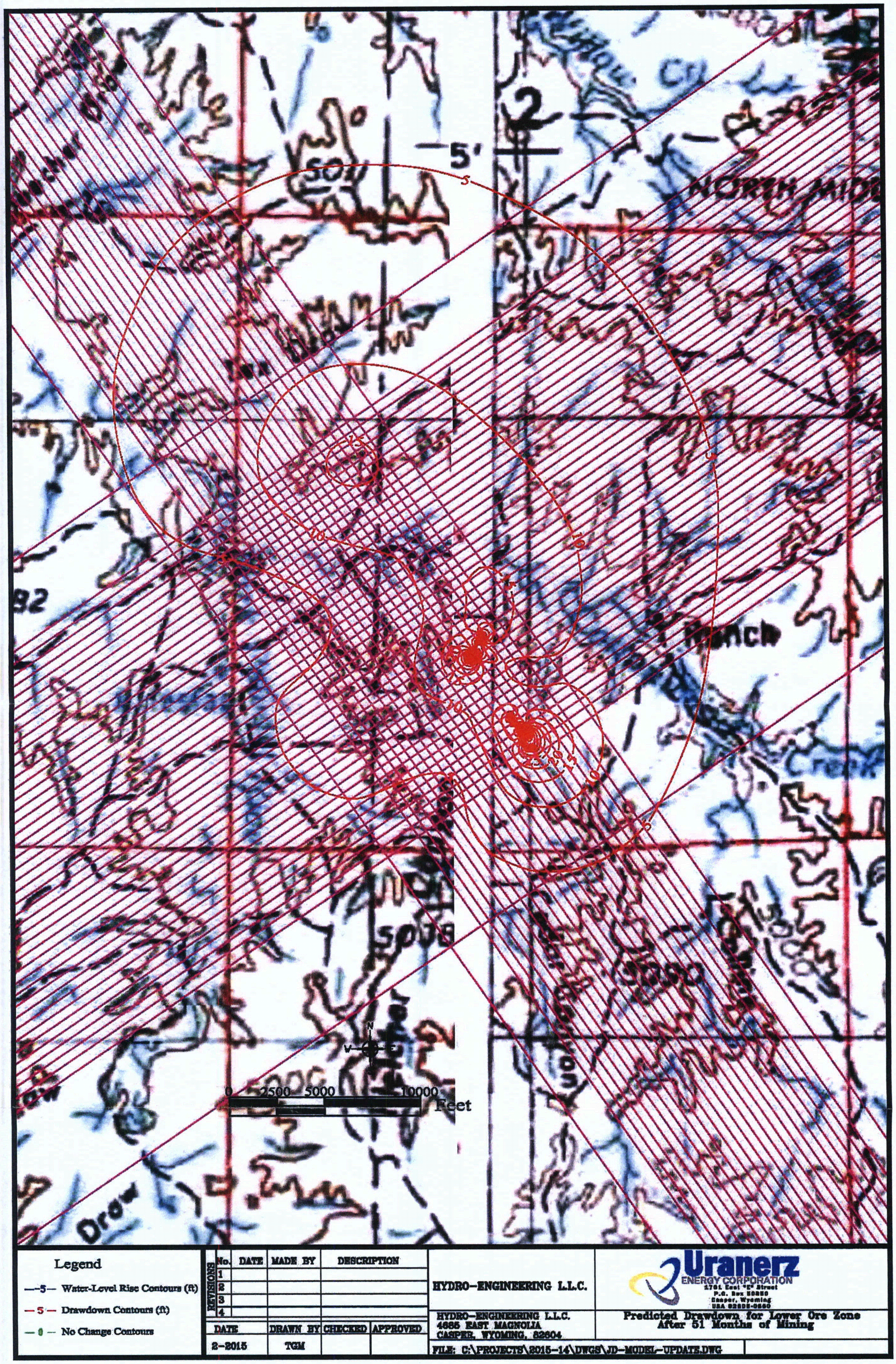

Figure MPI.1-13. Predicted Drawdown for Lower Ore Zone After 51 Months of Mining.

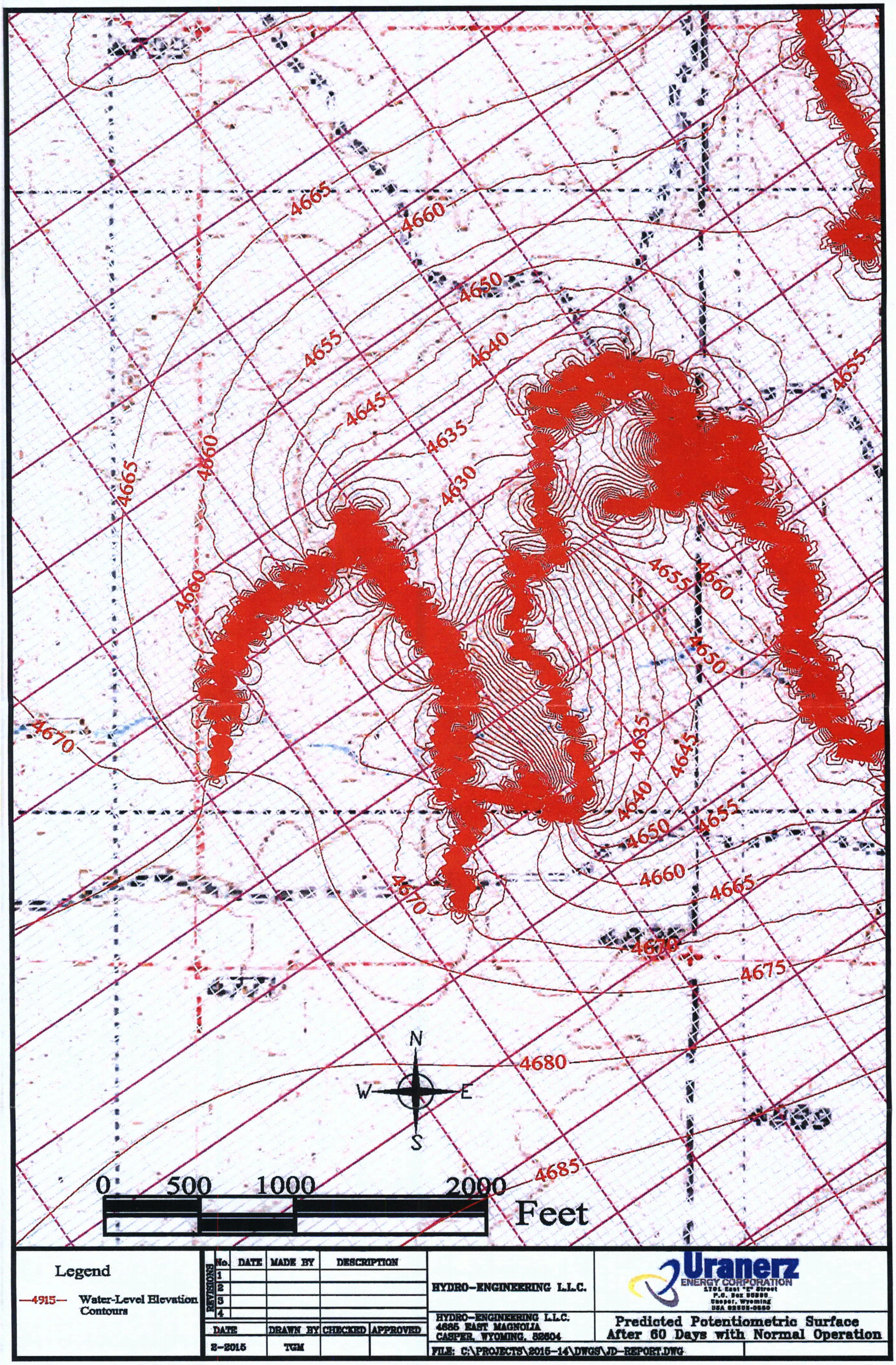

Figure MPI.1-14. Predicted Potentiometric Surface After 60 Days with Normal Operation.

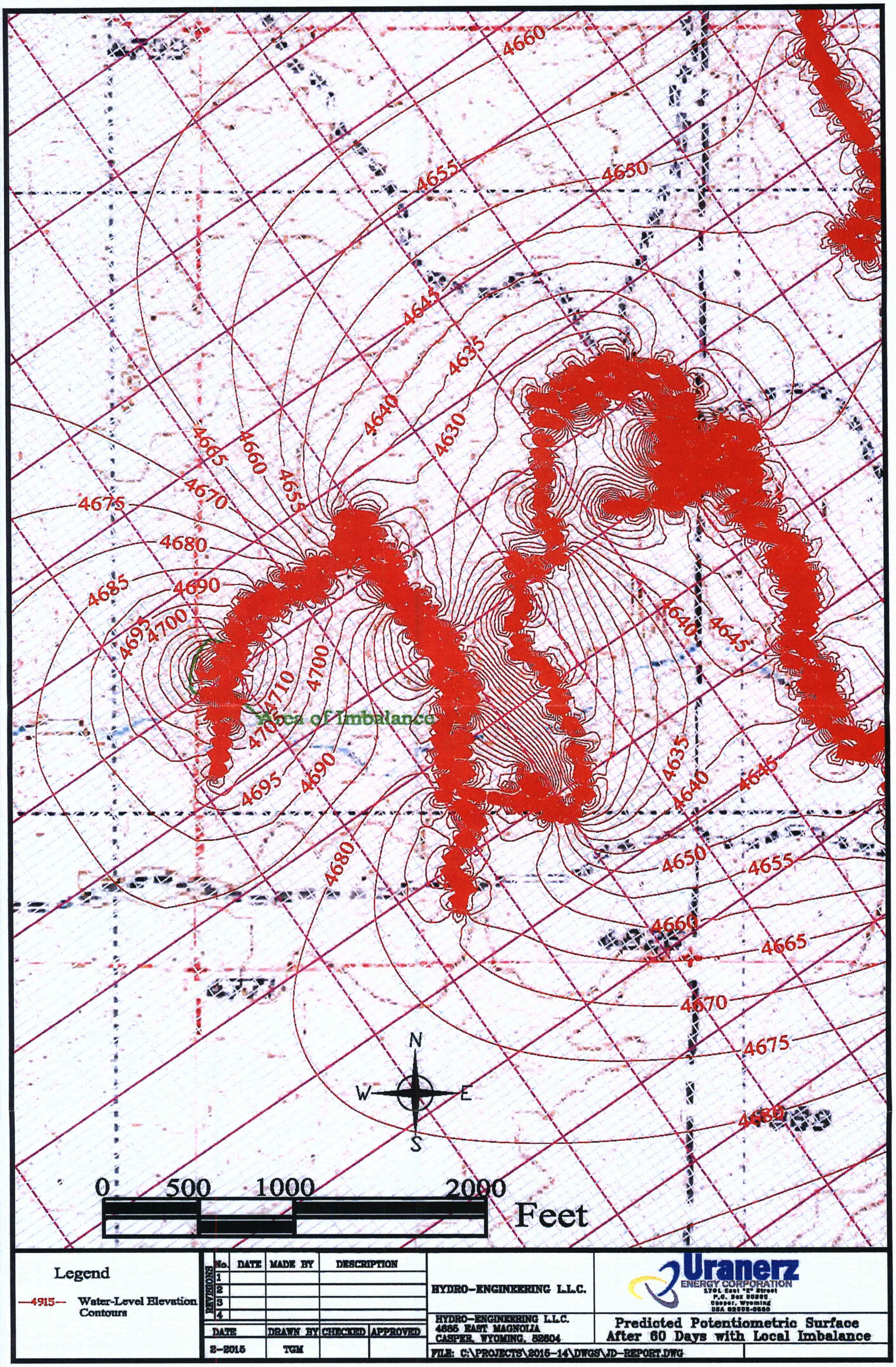

Figure MPI.1-15. Predicted Potentiometric Surface After 60 Days with Local Imbalance.

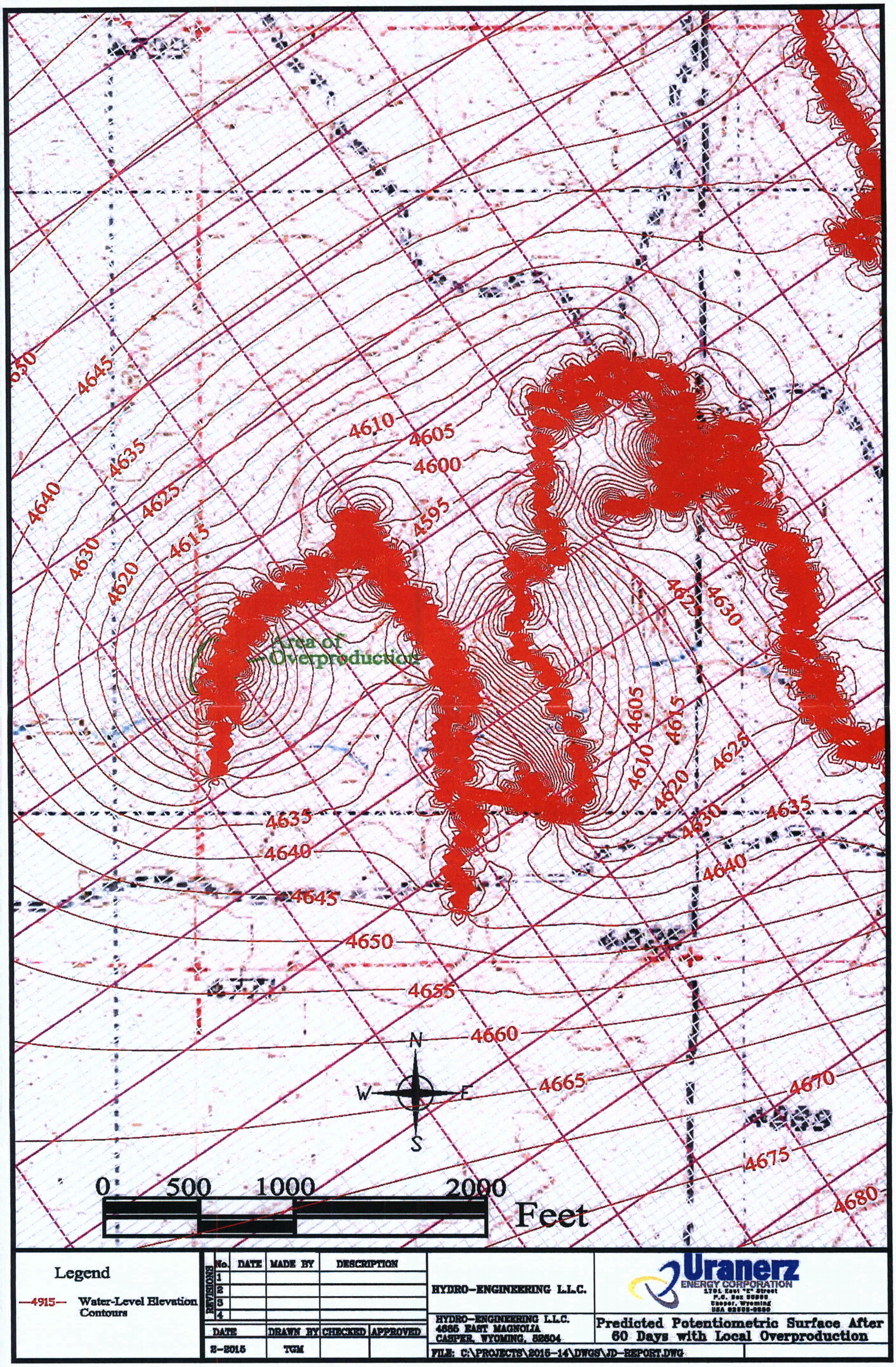

Figure MPI.1-16. Predicted Potentiometric Surface After 60 Days with Local Overproduction.

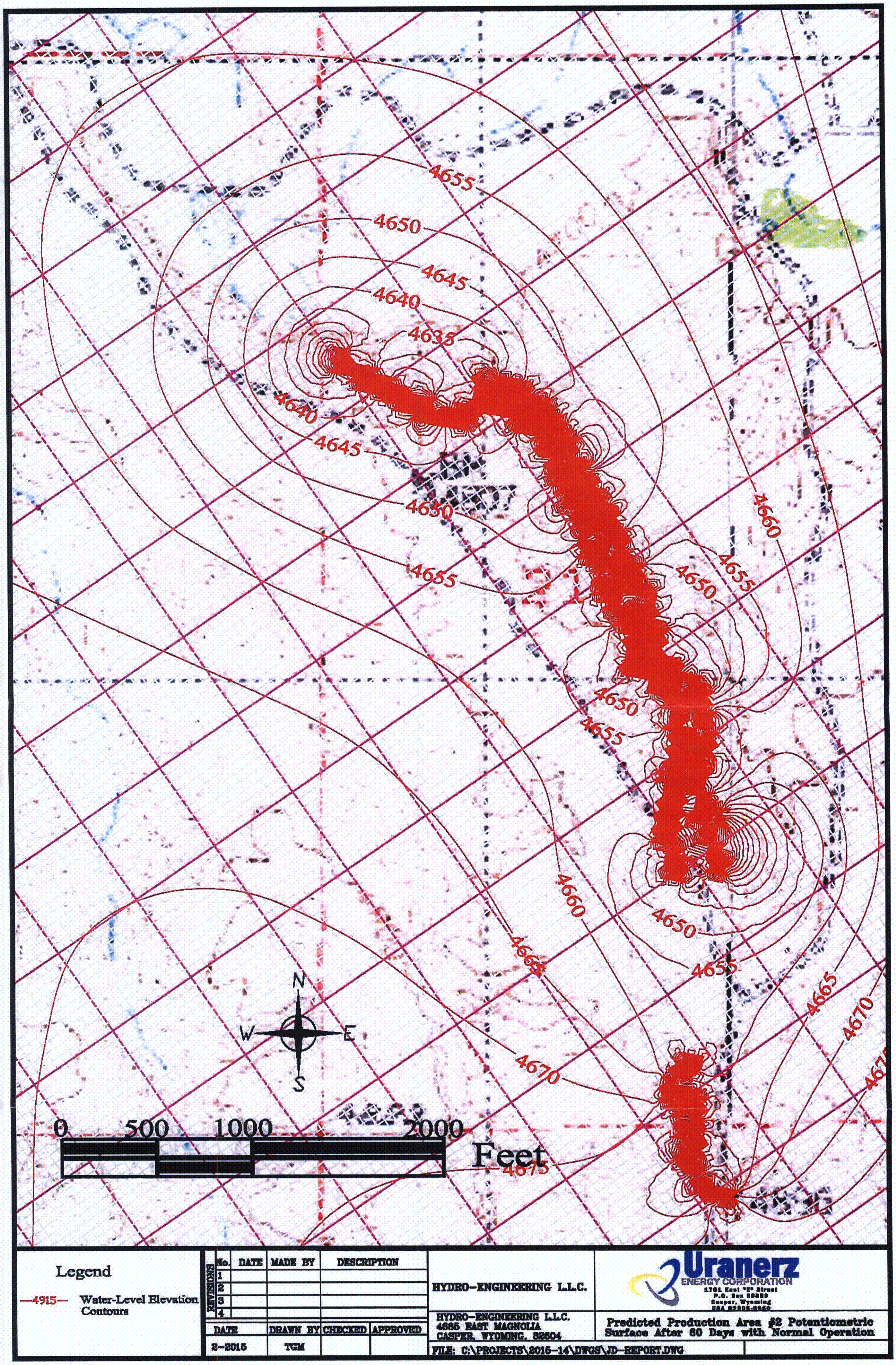

Figure MPI.1-17. Predicted Production Area #2 Potentiometric Surface After 60 Days with Normal Operation.

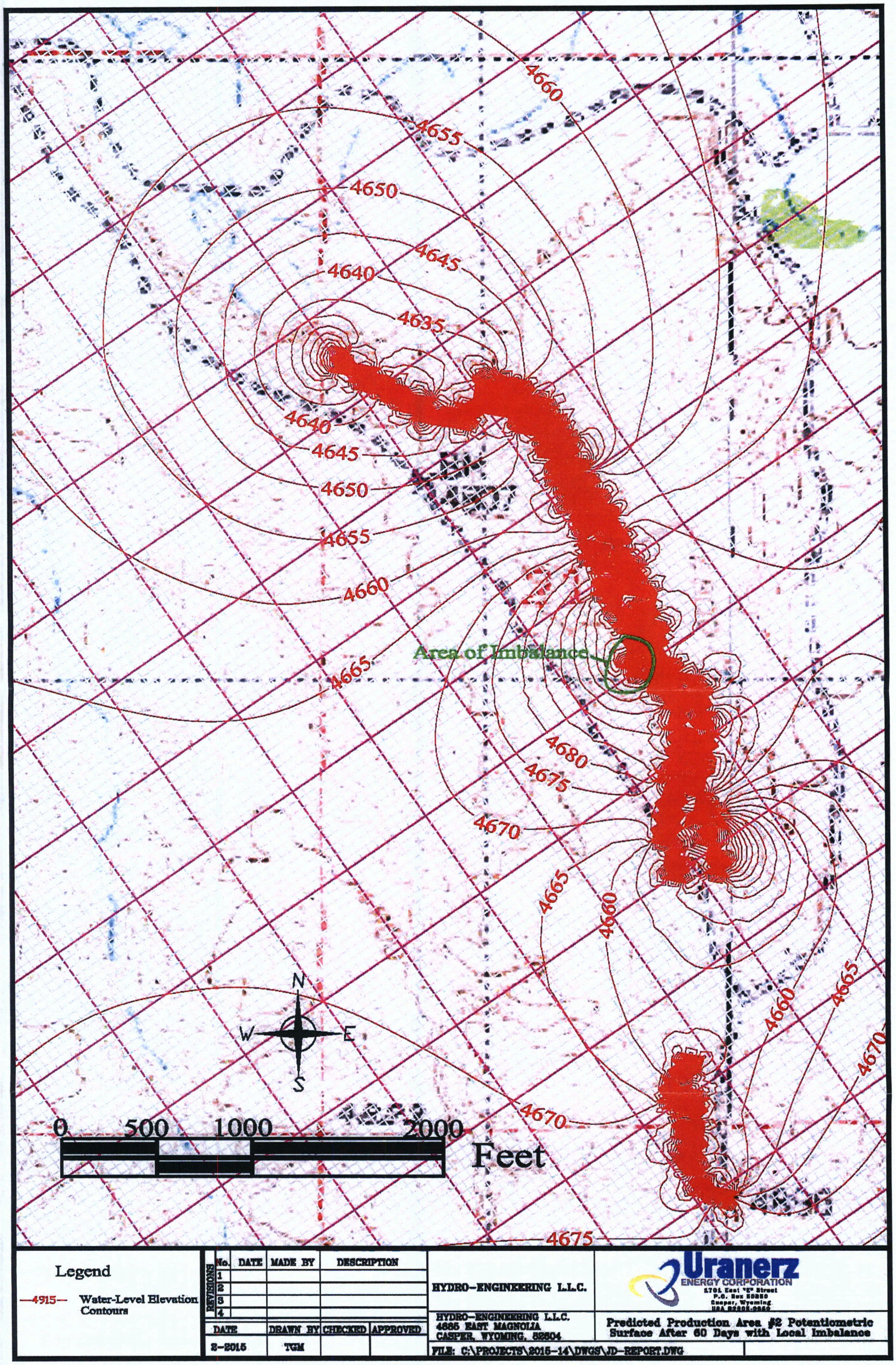

Figure MPI.1-18. Predicted Production Area #2 Potentiometric Surface After 60 Days with Local Imbalance.

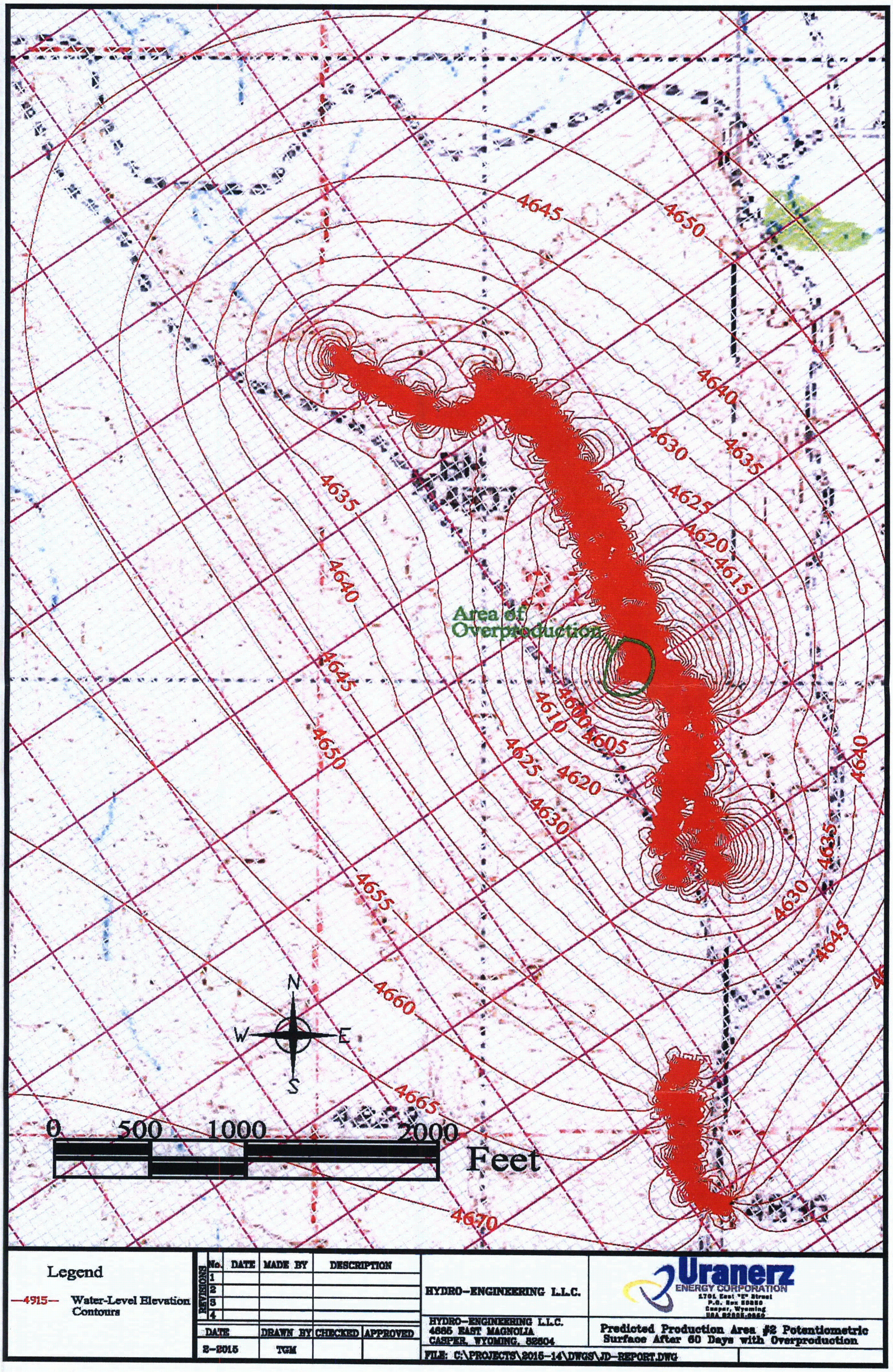

Figure MPI.1-19. Predicted Production Area #2 Potentiometric Surface After 60 Days with Local Overproduction.

ADDENDUM MP-C:

RESERVED

Revised April 2015
April 2014

3.2 ROAD RECLAMATION

3.2.1 Access Roads

Two access roads will be built to connect both the Nichols Ranch central processing plant (CPP) and the Hank satellite plant with the existing ranch roads. The length of the Nichols Ranch CPP road is approximately 0.20 mi in length. The Hank satellite plant road will also be approximately 0.20 mi in length. If the landowner desires, the roads will be left in place when operations are complete. If not, the roads will be reclaimed. Even if the roads are left in place, third party reclamation costs will be included in the reclamation bond estimate.

If the access roads are to be reclaimed, the first step will be to pick up and remove the scoria/gravel on the road surface. Once the scoria/gravel has been removed the roadbed will be disced or ripped. Next, the topsoil stored in the ditch will be reapplied on the road surface. Finally, the road surface will be mulched and seeded with the permanent seed mixture. **If the roads are on T-Chair Land Company surface reclamation will follow landowner stipulations (Addendum MP-A).**

No separate access roads will be required or constructed for the mining of the Jane Dough Unit. Uranerz will utilize existing access roads constructed into the Nichols Ranch Unit.

3.2.2 Wellfield Access Roads

The wellfield access roads will allow vehicular traffic to move from the plants to the wellfields and from one wellfield to another wellfield. The construction design for the wellfield access roads is present in Section 3.11 of the Mine Plan. At the time of decommissioning, the landowner will decide which wellfield access roads will remain and which roads will be reclaimed.

If wellfield access roads are to be reclaimed, the first step in reclaiming the wellfield access roads will be to pick up and remove the scoria/gravel so that the roadbed is back to the approximate original grade. Next, the roadbed will be ripped to reduce compaction. The topsoil will then be placed back on the disturbed area, will then be mulched, and seeded with the permanent seed mixture. Discing of the topsoil may be done to reduce compaction created during topsoil replacement. **If the roads are on T-Chair Land Company surface reclamation will follow landowner stipulations (Addendum MP-A).**

backfilled. These methods of topsoil salvaging have proven to be adequate as demonstrated by the successful revegetation and reclamation at prior and existing ISR operations. **The Nichols Ranch ISR Project will not result in any subsidence to the project area or surrounding areas. Please refer to Section 3.12 of the Mine Plan for additional discussion of subsidence.**

3.4 FINAL CONTOURING

Because of the nature of solution mining, very little, if any, construction activities will take place which would require any major contouring during reclamation. Any surface disturbances that do occur will be contoured to blend in with the natural terrain. No final contour map has been included since no significant changes in the topography will result from the proposed mining operation.

3.5 EROSION CONTROL PRACTICES

The potential for erosion and potential movement of sediments into drainages may occur during construction and reclamation activities associated with processing facilities and wellfields. Berms and contouring will be utilized when and where possible, to minimize potential erosion and sediment movement. Reseeding with native seed mixture or cover crops will also occur upon completion and reclamation of the project area. Reseeding of an area will take place during the appropriate growing seasons, either spring or fall, whichever comes first.

Surface water runoff should not be affected by the presence of any surface facilities including the wellfields and associated structures, access roads, office and maintenance buildings, pipelines, and processing facilities (both main and satellite facilities). In the event that surface runoff flows are impeded by any facilities, culverts and diversion ditches will be implemented to control the runoff and prevent excessive erosion. If the surface runoff is concentrated in an area, measures such as energy dissipaters will be used to slow the flow of the runoff so that erosion and sediment transport are minimized in the runoff.

Impacts to ephemeral drainages may occur with some of the mining activities such as wellfield operations or the construction of access roads. To avoid impacts to the drainages, existing roads within the project area will be utilized. If an ephemeral drainage may be impacted by the roads

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ADDENDUM A: NICHOLS RANCH ISR PROJECT SURETY ESTIMATE

ABBREVIATIONS

ISR	In Situ Recovery
BPT	Best Practical Technology
WDEQ	Wyoming Department of Environmental Quality
TDS	Total Dissolved Solids
IX	Ion Exchange
RO	Reverse Osmosis
NRC	Nuclear Regulatory Commission
CPP	Central Processing Plant
LQD	Land Quality Division

Wells that are constructed in any ephemeral drainage will use the appropriate erosion protection controls to minimize the impact to the drainage. Protection controls that could be used, but not limited to, are: grading and contouring, placement of hay bales, culvert installation, placement of water contour bars, and designated traffic routes. The drainage bottoms will be restricted to the work activities that are needed to construct and maintain the wells. If the wells are placed in a location in the drainage where runoff has the potential to impact the well, measures will be taken to protect the well and well head. Barriers surrounding the well such as cement blocks, protective steel casing around the well heads, or other measures to protect the wells from damage will be utilized.

3.6 VEGETATION RECLAMATION PRACTICES

All revegetation practices will be conducted in accordance to the Wyoming Department of Environmental Quality-Land Quality Division (WDEQ-LQD) regulations and the methods outlined in the mining permit. Topsoil stockpiles, along with as many as practical disturbed areas of the wellfield, will be seeded with the temporary seed mixture found in Table 3-1 at a seeding rate of 14 pounds pure live seed per acre per species throughout the mining operation to reduce wind and water erosion. **Seed mixtures are developed through discussions with the landowner and the BLM (Hank Unit only).** Table 3-2 **is a list of seed types that may be used in** the final seed mixture that will be used for reclamation **on private surface. Table 3-3 is the seed mix used for BLM surface areas at the Hank Unit. Any changes to the seed mix will be submitted to WDEQ-LQD for review.** A seeding rate of **at least** 15 pounds of pure live seed per acre will be used when using a rangeland drill. On areas where it is not practicable to use a drill, the seed will be broadcast at a rate of 30 pounds pure live seed per acre.

Table 3-1 Uranerz Temporary Seed Mixture.

Species	Pounds PLS/acre
Western Wheatgrass	**5**
Thickspike Wheatgrass	**5**
Slender Wheatgrass	**4**
	Total 14 PLS

Table 3-2 Uranerz Final Reclamation Seed Mixture.

Species	Percent of Mix	Pounds PLS/acre
Western Wheatgrass	28	4.2
Revenue Slender Wheatgrass	28	4.2
Bozoisky Russian Wildrye	19	2.85
Greenleaf Pubescent	9	1.35
Gulf Annual Ryegrass	6	0.9
Yellow Blossom Sweet Clover	5	0.75
Ladak 65 Alfalfa	5	0.75
Species that may be substituted for or added to the above mix		
Pubescent Wheatgrass	**19**	**2.85**
Intermediate Wheatgrass	**15**	**2.0**

Table 3-3 BLM Seed Mix Used for Surface Areas at the Hank Unit.

Species	Percent of Mix	Pounds PLS/acre
Western Wheatgrass	**37**	**5.5**
Thickspike Wheatgrass	**20**	**3.0**
Green Needlegrass	**10**	**1.5**
Slender Wheatgreat	**20**	**3**
Needle and Thread	**10**	**1.5**
Purple Prairie Clover	**3**	**0.5**

The success of the final revegetation will be determined by measuring the revegetation in meeting prior mining land use conditions and reclamation success standards as compared to the "Reference Area" outlined in WDEQ-LQD Guideline No. 2. The Extended Reference Area allows for a statistical comparison of the reclaimed area with an adjacent undisturbed area of the same or nearly the same vegetation type. The area that the Extended Reference Area has to encompass needs to be at least one half the size of the reclaimed area that is being assessed, or at least no smaller than 25 acres in size.

In choosing the Extended Reference Area, the WDEQ-LQD will be consulted. This will ensure that the Extended Reference Area adequately represents the reclaimed area being assessed.

Additionally, a sampling plan for measuring the revegetation success will be submitted and approved by the WDEQ-LQD prior to sampling. The success of the final revegetation and final bond release will be determined by the WDEQ-LQD.

Measures such as fencing off newly seeded areas and reseeding when livestock is not present will be implemented to protect newly seeded areas from being disturbed. The fencing will be used to protect the newly seeded areas from being grazed on by livestock and wildlife in the revegetated area. Additionally, livestock on the private ranch land where the Nichols Ranch ISR Project is located will be moved to different pastures throughout the year. Communications with the landowner on the location of their livestock will be maintained so that seeding of areas can be conducted when livestock is not present in the area so that the newly seeded area will be allowed to grow. Seeding of the wellfield disturbance will take place while the wellfield is in production. While the wellfield is in production, it will be fenced off not only for security measures, but also to protect the wellfield from livestock entry. Additionally, grazing will be excluded following reclamation seeding for a minimum of two (2) years to allow improved establishment of vegetation cover with minimized grazing pressure.

APPENDIX JD-D5:

GEOLOGY

Revised May 2015
April 2014

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JD-D5.0 GEOLOGY

JD-D5.1 HISTORY

There are two lines of thought as to the origin of uranium in the Powder River Basin and Pumpkin Buttes area. The first theory places the source of uranium from the weathering of the mountain cores which have also been cited as the source for the arkosic host sandstones. The basement rocks of the Granite Mountains for example, have been determined to have high concentrations of uranium (20 to 30 parts per million). It has also been estimated that the granites have lost 70% of their original uranium content. Emplacement of the uranium under this theory would have taken place beginning 40 to 45 million years ago, shortly after the host sands were deposited in the basins. The second theory places the source of uranium as overlaying Oligocene and Miocene volcanic tuffs which as they weathered down, the uranium leached out into the groundwater system. The rhyolite volcanic tuffs were the result of volcanic activity to the west. Emplacement of the uranium has been cited as 20 to 32 million years ago. Since both theories are plausible, some geologists subscribe to a duel theory where each possible source contributed some percentage to the overall uranium occurrence.

Regardless of which source or if preferred, a duel source, the uranium came from, both would require a climate with active chemical weathering to breakdown the rock matrix and put the uranium into groundwater solution. One suggested environment for this to occur is the modern day savanna climate. Savanna climates are characterized by very wet, humid annual periods followed by hot and dry periods. This type of climate produces rapid chemical weathering and high oxidation potentials, which would have been needed to solubilize the uranium and keep it in solution until the groundwater system encountered a reducing, oxygen deficient environment such as the carbon trash rich sands in the Powder River Basin. When the uranium charged groundwater flowed into the reduced sandstone environment, the oxidized uranium precipitated out of solution along the interface between the two chemical environments. The uranium was deposited in 'C' shaped rolls, which are 5 to 30 ft. thick and in plan view may be a few feet to 500 ft. wide and tens of miles in length. Along the length of the trace of the chemical roll, ore grade uranium may be found; however, ore is not likely along ever mile of the front. During the time that uranium was emplaced, as is true today, the groundwater in the Powder River Basin generally flowed to the north and northwest. As the original uranium charged groundwater flowed in the host sands, the chemical reductant was consumed and the roll fronts migrated down the hydrologic gradient leaving in their wake, a characteristic yellow to red to brown stain on the sandstone grains (see Figure JD-D5-a in map pocket). As many as 11 separate roll front systems have been identified in different horizons of the Wasatch Formation in the Powder River Basin area. A diagram of stacked roll fronts is depicted in Figure JD-D5-b (map pocket).

JD-D5.2 REGIONAL GEOLOGY

The Jane Dough Unit is located in the Powder River Basin (PRB) which is a large structural and topographic depression parallel to the Rocky Mountain trend. The basin is bounded on the south by the Hartville Uplift and the Laramie Range, on the east by the Black Hills, and the Big Horn Mountains and the Casper Arch on the west. The Miles City Arch in southeastern Montana forms the northern boundary of the basin.

The PRB is an asymmetrical syncline with its axis closely paralleling the western basin margin. During sedimentary deposition, the structural axis (the line of greatest material accumulation) shifted westward resulting in the basin's asymmetrical shape. On the eastern flank of the PRB, sedimentary rock strata dip gently to the west at approximately 0.5 to 3.0 degrees. On the western flank, the strata dip more steeply, 0.5 to 15 degrees to the east with the dip increasing as distance increases westward from the axis. The Jane Dough Unit location in the PRB is shown in Figure JD-D5-1 (see map pocket).

The PRB hosts a sedimentary rock sequence that has a maximum thickness of about 15,000 ft. along the synclinal axis. The sediments range in age from Recent (Holocene) to early Paleozoic (Cambrian - 500 million to 600 million years ago) and overlie a basement complex of Precambrian-age (more than a billion years old) igneous and metamorphic rocks. Geologically, the PRB is a closed depression in what was, for a long geologic time period, a large basin extending from the Arctic to the Gulf of Mexico. During Paleozoic and Mesozoic time, the configuration of this expansive basin changed as the result of uplift on its margins.

By late Tertiary - Paleocene time, marked uplift of inland masses surrounding the Powder River Basin resulted in accelerated subsidence in the southern portion of the basin with thick sequences of arkosic (containing feldspar) sediments being deposited. Arkosic sediments were derived from the granitic cores of the Laramie and Granite Mountains exposed to weathering and erosion by the Laramide uplift. Near the end of Eocene time, northward tilting and deep weathering with minor erosion took place in the basin. Subsidence resumed in the late Oligocene and continued through the Miocene and into the Pliocene. A great thickness of tuffaceous sediments were deposited in the basin during at least a part of this period of subsidence. By the late Pliocene, regional uplift was taking place, leading to a general rise in elevation of several thousand feet. The massive erosional pattern that characterizes much of the PRB began with the Pliocene uplift and continues to the present. Of particular interest in the project area are the Tertiary-age formations:

FormationAge (Million Years)
White River (Oligocene)25-40
Wasatch (Eocene)40-60
Fort Union (Paleocene)60-70

The White River Formation is the youngest Tertiary unit that still exists in the PRB. Locally, it's only known remnants are found on top of the Pumpkin Buttes. Elsewhere the unit consists of thick sequences of buff colored tuffaceous sediments interspersed with lenses of fine sand and siltstone. A basal conglomerate forms the resistant cap rock on top of the buttes. This formation is not known to contain significant uranium resources in this area.

The Wasatch Formation is the next unit down and consists of interbedded mudstones, carbonaceous shales, silty sandstones, and relatively clean sandstones. In the vicinity of the Pumpkin Buttes, the Wasatch Formation is known to be 1,575 ft. thick (Sharp and Gibbons, 1964). The interbedded mudstones, siltstones, and relatively clean sandstones in the Wasatch vary in degree of lithification from uncemented to moderately well-cemented sandstones, and from weakly compacted and cemented mudstones to fissile shales. The Wasatch contains significant uranium resources and hosts the ore bodies for which this permit application is subject to.

The next unit is the Fort Union Formation. In the PRB this unit is lithologically similar to the Wasatch Formation. The Fort Union includes interbedded silty claystones, sandy siltstones, relatively clean sandstones, claystones, and coal. The degree of lithification is quite variable, ranging from virtually uncemented sands to moderately well-cemented siltstones and sandstones. The total thickness of the Fort Union in this area is approximately 3,000 ft. The Fort Union contains significant uranium mineralization at various locations in the basin. The Fort Union is also the target formation for Coal Bed Methane (CBM) extraction activities. CBM target depths in the Jane Dough Unit are about 1,000 and 1,200 ft. Since CBM wells have their casings cemented to the surface, no or little interference, water loss, or water invasion is anticipated other than for localized areas. Addendum JD-D6H further discusses CBM.

Maps of the surface and sub-surface geology of the Powder River Basin are depicted in Exhibits JD-D5a and JD-D5b (see map pockets).

JD-D5.3 SITE GEOLOGY

Depositional Environment: Jane Dough

In the Pumpkin Buttes Mining District, the Eocene Wasatch Formation hosts the geologic setting for uranium mining at the Jane Dough Unit. The Wasatch Formation in this area was deposited in a multi-channel fluvial and flood plain environment. The climate at the time of deposition was wet tropical to subtropical with medium stream and river sediment load depositing a majority of medium grained materials. The source of the sediments, as evidenced by abundant feldspar grains in the sandstones, was the near-by Laramie and Granite Mountains (see Figure JD-D5-1a).

At the Jane Dough Unit location, there are eight identified fluvial sandstone horizons or units. Beginning with the deepest unit they are the 1, A, B, C, F, G and H Sand units which are stratigraphically the same as at Nichols Ranch ISR (see Figure JD-D5-2). Separating the sand units are horizons composed of siltstones, mudstones, carbonaceous shales and poorly developed thin coals. These fine-grained materials were deposited in flood plain, shallow lake (lacustrine) and swamp environments. Ultimately, deposition of the Wasatch Formation was a function of stream bed load entering the basin and subsidence from within the basin. However, in the central part of the Powder River Basin, long periods of balanced stability occurred. During these periods the stream gradients were relatively low and allowed for development of broad (0.5 to 6.0 mi wide) meander belt systems, associated overbank deposits, and finer grained materials in flood plains, swamps and shallow bodies of water. Evidence for depositional stability exists as a number of coal bed markers with little or no channel scouring are in contact with the major sand horizons (Davis, 1970). The A Sand at Jane Dough is in close proximity to basal lignite and carbonaceous shales.

In a fluvial meandering stream process, the flow channel is sinuous in plan view with the highest flow energy concentrated on the outside edge of the channel as it turns through a meander. This results in cutting into the outside channel wall and caving material into the channel especially during flooding. In cross section view, the outside edge of a meander is the steepest and the inside of the meander is sloped more gently. The inside edge of a meander is where deposition takes place. Finer materials are deposited in the shallower (upper) slow flow region of the inside slope and coarser materials are deposited in the lower region. The major fraction of sand in the Wasatch Formation in the Pumpkin Buttes area is medium-grained with lesser fractions of coarse and fine grains. This is accompanied with mostly medium scale festoon cross bedding and current lamented cross bedding. These features can only be seen in cores. In a typical point bar sedimentation process, grain size and sediment structure fine upwards within a single point bar accumulation (see Figure JD-D5-2a).

The meandering stream environment is a process of cut and fill. Each time a cut occurs, the inside slope fills with sand and sediment. A single increment of this process results in a structure called a point bar and an accumulation of point bars is sometimes referred to as a meander belt. As the meander process progresses, meander loops eventually migrate down gradient in the direction of flow and can laterally spread out in almost any direction. The size of the complete meander belt system is a function of the size of the valley or basin and stream flow rate, load and gradient. If the subsidence rate and stream load are in the proper proportion, successive layers of meander belts, or meander belt systems, may form as the stream channel wanders back and forth during subsidence.

Meander belts in the Wasatch formation are generally 5 to 30 ft. thick. The A Sand at Jane Dough is made up of three to four stacked meander belts. Individual meander belt layers will rarely terminate at the same location twice. Meanders have been noted to frequently terminate in the interior of a belt system but are more likely to terminate somewhere closer to the edge of the meander stream valley. The net effect for fluvial sands is to generally thin away from the main axis of the meander belt system. The A Sand meander belt system at Jane Dough is four miles wide as at Nichols Ranch.

On an electric log resistivity curve, the grading is apparent where the curve sharply deflects from low to higher resistance and then gradually returns to lower resistance in an upward direction. Other meander belt system sand features such as overbank and crevasse deposits are present as fingers of sand that taper out from a meander termination. These are thin sands without a lot of grain size sorting. Inter –meander channel sands occur between meanders that are migrating in different directions. These sands have more uniform grain size and show on the electric log as a semi-flat curve with only small variations. Tributary and meander cut-off channel sand features form where pre-existing sediments are scoured by a river or stream and subsequently fill with medium and coarse sediments. These channels may cut randomly into meander belts, flood plain or swamp sediments (see Figure JD-D5-2b). On the electric resistivity log, channel fills have a massive semi-rounded signature.

Jane Dough Uranium Deposition

The A Sand at Jane Dough is the same stratigraphic unit as the A Sand at Nichols Ranch. The mineralization on the east and west sides of Jane Dough are a continuation of the same chemical cell which is to be mined at Nichols Ranch.

The Jane Dough Mining Unit and Nichols Ranch Unit ISR Project are located in the Eocene Wasatch Formation about eight miles west of the South Pumpkin Butte and straddles the Johnson and Campbell County lines. The mineralized sand horizons are in the lower part of the Wasatch, at an approximate average depth of 550 ft. The host sands are primarily arkosic in composition, friable, fine- to coarse-grained and contain trace amounts of carbonaceous material and organic debris.

The ore body at the Jane Dough Unit is a typical Powder River Basin type roll front deposit. Uranium ore, where present, is found at the interface of a naturally occurring chemical boundary between reduced sandstone facies and oxidized sandstone facies. The ore body at the Jane Dough Unit forms roughly two lateral sides, an east side and west side, and are continuations of the Nichols Ranch uranium deposit. The interior area formed by the sides and nose is the chemically oxidized sandstone facies and the exterior of the area is the reduced sandstone facies. The east side of the mineralization appears to be curvilinear in form while the west side is irregular, having two sub-noses (penetrations) as shown in Figure JD-D5-3.

The uranium ore bearing sandstone unit on the east side of the Jane Dough Unit is composed of at least two vertically stacked subsidiary roll fronts. The roll fronts have been designated the middle and lower fronts. Stacked roll fronts develop due to small differences in sandstone permeability or from the vertical contact between successive meander loop sand accumulations. The lateral surface distance between stacked rolls ranges from 0 to over 200 ft. and results in some overlapping patterns. The presence or absence of one or more of the sand channels creates the thin and thick areas on the A Sand Isopach Map (Exhibit JD-D5-18). The mineralization on the west side appears to be principally one roll front which occasionally splits into three sub-rolls, having only minor lateral separation between the sub-rolls.

The Jane Dough Unit ore body has uranium mineralization composed of amorphous uranium oxide, sooty pitchblende, and coffinite. The uranium is deposited in void spaces between detrital sand grains and within minor authigenic clays. The host sandstone is composed of quartz, feldspar, accessory biotite and muscovite mica, and locally occurring carbon fragments. Grain size ranges from very fine- to very coarse sand but is medium-grained over all. The sandstones are weakly to moderately cemented and friable. Pyrite and calcite are associated with the sands in the reduced facies. Hematite or limonite stain from pyrite, are common oxidation products in the oxidized facies. Montmorillonite and kaolinite clays from oxidized feldspars are also present in the oxidized facies.

There are five notable Wasatch Formation sand units in the Jane Dough Unit mining area. The sand members have been identified as G, F, B, A, and the 1 (one) Sand units. The G Sand unit is the shallowest and the 1 Sand unit is the deepest. The principle uranium ore bearing sand unit is the A Sand. The B Sand has been designated the overlaying aquifer **in the southwest portion of** and the **Jane Dough Unit and the** 1 Sand the underlying aquifer. **In the east and northwest portion of the Jane Dough Unit the B Sand rests directly on the A Sand. In these areas the C, F, or G Sands may be considered the overlying aquifer.** While the B Sand is wide spread over the mine area the 1 Sand is confined to deep cut channels cut into the 1A Mudstone. Both of the A and B Sand units thin to zero in the southwest.

The Jane Dough A Sand ore body is bounded above and below by aquitards. **In the southwest portion of the Unit area by the AB Mudstone is the upper aquitard and the 1A Mudstone is the lower aquitard.In these areas the B Sand rests directly on the A Sand in the northwest and east portions of the Unit area. In these areas the B Sand will be combined with the A Sand and the next mudstone and sand above the top of the B Sand will be considered the upper aquitard and upper aquifer, respectively. The 1A Mudstone is the lower aquitard for the entire Unit area.** The upper and lower aquitards are composed of shales or mudstones, silty shales and shaley lignitic horizons. Measured permeability of the mudstones and shales has been found to be less than 0.1 millidarcies whereas the permeability of the ore sands average between 250 and 2000 millidarcies.

Site geology and stratigraphy are summarized in cross section Exhibits JD-D5-1 through JD-D5-15 (see map pockets) for the Jane Dough Unit. These cross sections run north/south and east/west through the permit boundaries and ore bodies. The cross sections provide for correlation of the sand units, aquitards, and the nomenclatures utilized for the project areas. Figure JD-D5-2 details a typical stratigraphic column for the Jane Dough Unit.

Description of the Jane Dough Unit aquifers and aquitards are as follows:

Beginning with the lower monitor aquifer sand at the Jane Dough Unit, this unit has been designated the 1 (one) Sand. This sand is variable ranging from 0 to 75 ft. in thickness and occurs at depths of 430 to 630 ft. below the ground surface. The sand is very fine to coarse-grained and is gray in color in the Jane Dough Unit area. The 1 Sand is confined to incised valleys that cut into the 1A Mudstone. Two significant 1 Sand trends are mapped in the Jane Dough Unit area as shown on Exhibit JD-D5-16. This sand is defined by being over 10 ft. thick and showing some continuity between test holes. The eastern channel runs to the north into the Nichols Ranch Unit (Nichols Ranch PA #1, Figure 2-12). The data from Jane Dough drilling suggests that it is on the order of one quarter to one half of a mile wide. The complete 1 Sand section can be seen in test hole U07D-01 (Exhibits JD-D5-7 and JD-D5-2) where the 1 Sand is 66 ft. thick. No other holes were drilled completely through this interval but a few holes appear to have penetrated the top on this side of the property. On the west side the 1 Sand is observed in the test hole A36-31-016 log (Section CC; Exhibit JD-D5-3) where it is approximately 75 ft. thick. This sand channel appears to also trend north-south on the west side of the mine unit. It is present in holes to the north but is not present to the east as seen in Exhibits JD-D5-12 and JD-D5-13.

Exhibits JD-D5-1 through JD-D5-15 are composed of electric logs that have penetrated deepest horizons in the local area. It is clear that the 1 Sand as described is not present in the central portion of the Jane Dough Unit even though a number of holes have been drilled well below the A Sand. There are sand stringers which are generally less than ten ft thick contained within the 1A Mudstone. These sands are difficult to see in the samples and are only observed on electric logs. On Exhibit JD-D5-16 are number marked with + signs which indicate the combined measured thickness of the sand stringers as measured on the electric log. They appear to be generally discontinuous lenses with little to no recharge. Monitor Test well URZ J1-6 (Exhibit JD-D5-5) pumped 0.5 gpm for 1000 minutes with 75 ft. of drawdown. This indicates that this 1 Sand stringer might produce 0.5 gpm at this location. Monitor Test well URZ-J1-12 (Exhibit JD-D5-12) **was pumped at rates of 0.5 and 1.0 gpm during two tests lasting approximately 24 hours for each test**. Monitor Test well URZ-**J1-23-1 was** pumped **at a rate of** 1.5 gpm **during a sampling event.** The sand intervals that were tested as aquifers are greater than 60 ft. below the base of the A Sand.

The next unit up section is the aquitard, 1A Mudstone. It consists of dark and medium gray mudstones and carbonaceous shale with occasional thin lenses of poorly developed coal. The 1A Mudstone Isopach (Exhibit JD-D5-17) shows that this unit ranges in thickness from 29 to more than 120 ft. thick. The top of the 1A Mudstone is bounded by the A Sand base and by the top of the 1 Sand, where the 1 Sand is present. The holes labeled with + signs indicate the thickness between the base of the A Sand and total depth of the hole. The red numbers with + indicate this thickness of 1A Mudstone drilled is 50 ft. or greater without encountering any significant 1 Sand. Where the 1 Sand channels area not present the next significant lower marker is the Badger Coal which is located approximately 120 ft. below the base of the A Sand. Several holes have been drill across the mine area to the Badger Coal or reached total depths just above it. Cross sections AA and BB (Exhibits JD-D5-1 and JD-D5-2) show these relationships. The thin areas of 1A Mudstone reflects the presence of the 1 Sand channels. The isopach of the 1A Mudstone shows that many holes have been drilled to 50 beyond the base of the A Sand and have not encountered a 1 Sand channel.

The A Sand is the next unit up section. This is the mining zone sand at the Jane Dough Unit. Within the Jane Dough Unit boundary the unit has a thickness between 0 and 115 ft. The A Sand is thickest to the east and thins to the west (Exhibit JD-D5-18). The A Sand is fine- to coarse grained and is gray or red in color depending on location relative to the ore body as discussed above. The A Sand is occasionally separated by lenses of mudstone and siltstone which rarely exceed 15 ft. in thickness. The mudstone lenses are generally 50 to 100 ft. wide and may extend for a few hundred feet in a north/south direction. The lenses are not expected to present any problem to mining or restoration. The A Sand is extensive and has been correlated across the area between the Jane Dough and Nichols Ranch Units.

The next up section unit is Jane Dough Unit AB Shale aquitard (Exhibit JD-D5-19). It varies from 0 to 160 ft. thick, thickening to the west and thinning to zero the east and **northwest**. This unit consists of gray mudstones and thin discontinuous light gray siltstones. Where the AB Shale aquitard is not present the B Sand sits directly upon the A Sand.

The next higher unit at the Jane Dough Unit is the B Sand upper monitor aquifer **in the southwest portion of Unit area** (Exhibit JD-D5-20). The B Sand ranges in thickness from 0 to 234 ft. The B Sand is fine- to coarse grained and red or oxidized within the permit boundary. Elsewhere in the Pumpkin Buttes area the B Sand is host to some large known ore bodies including those at Christensen Ranch and North Butte. The body of the B Sand is occasionally split by lenses of mudstone, siltstone, and carbonaceous shale. Some of these mudstone splits exceed 25 ft. in thickness and may extend for thousands of feet. Most are more localized. The mudstones will be further delineated as drilling progresses.

Above the B Sand is the CB Mudstone aquitard (Exhibit JD-D5-26). This unit is defined as the mudstone between the top of the B Sand and the base of the C Sand (where the C Sand is present and exceeds ten feet in thickness) with the maximum thickness being defined as the top of the B Sand to the base of the first marker above the B sand. The CB Mudstone unit consists of gray mudstones and thin discontinuous light gray siltstones. It is 40 to 80 ft. over most of the Jane Dough area.

The C Sand (Exhibit JD-D5-27) is defined as the sand bodies which are greater than 10 ft. thick and located above the B Sand and below the first marker. This marker is a think lignite to coal bed which is generally less than two feet thick. The C Sands are up to 55 ft. thick and appear to be discontinuous over the Unit area. They are composed of silt to medium grained sand and are gray in color. No evidence of oxidation or mineralization has been observed in this sand indicating no significant water flows have gone through this unit. The C Sand appears to be a poor aquifer as discussed in JD-D6 Hydrology.

The FB Mudstone is the interval from the top of the B Sand to the base of the F Sand, where the F Sand is present. Where the F Sand is not present the top of the interval is

defined as being from the top of the first marker to approximately 100 ft. above the top of the first marker. In some portions of the Jane Dough Unit there is often a second marker (thin lignite bed) at approximately that level but it is not always present. The FB Mudstone unit consists of gray mudstones and thin discontinuous light gray siltstones. The isopach map (Exhibit DJ-D5-24) ranges from 0 to 70 ft. thick across the Jane Dough area.

The F Sand is the next unit up section and includes any sand that is situated between the first marker and up to 100 ft. above the 1st marker. At the Nichols Ranch Unit this unit is the shallow monitor zone sand and this would be true for some areas of Jane Dough where the C Sand is not present. This sand is medium and fine-grained, red or gray and is over 70 ft. thick as mapped in Exhibit JD-D5-23. The F Sand is generally not present over the east portion of the Jane Dough Unit.

The GB Mudstone is defined as being the interval between the top of the B Sand and the base of the G Sand. This unit consists of gray mudstones, thin carbonaceous shales, poorly developed lignitic coal beds, and thin discontinuous light gray siltstones. Exhibit JD-D5-22 shows this unit's thickness ranges from 140 to 300 ft. Where the F Sand does not exist this would be the upper aquitard.

The uppermost relatively continuous aquifer in the Jane Dough Unit is the G Sand. Where the F Sand does not exist this would be the overlying aquifer. This sand is medium and fine-grained, red or gray and is over 60 ft. thick as mapped in Exhibit JD-D5-21. This unit appears to be present over most of the Jane Dough Area. It outcrops to the surface on the northern and southwest portion of the area where steep gullies have been incised into present land surface.

Peizometric surfaces for the 1, A, B, F, and G Sands can be seen on the cross sections, Exhibits JD-D5-1 through JD-D5-15. A detailed discussion of the remaining upper aquifers and aquitards can be found in the Nichols Ranch ISR Project, Appendix D5, Section D5.3, Site Geology.

Isopach maps depicting the **G Sand, GB Mudstone, F Sand, FB Mudstone, C Sand, CB Mudstone,** B Sand, AB Shale, A Sand, 1A Shale, and 1 Sand for Jane Dough are found as Exhibits JD-D5-16 through **D5-26** (see map pockets).

JD-D5.4 ABANDONED DRILL HOLES

Addendum JD-D6I of Appendix JD-D6.5-Hydrology discusses all known abandoned exploration drill holes located in the area of the Jane Dough Unit.

JD-D5.5 SEISMOLOGY

The area of central Wyoming where the Jane Dough Unit site is located lies in a relatively minor seismic region of the United States. Although distant earthquakes (such as the western Wyoming area) may produce shocks strong enough to be felt in the Powder River Basin, the region is ranked as a one (1) seismic risk as shown in Figure JD-D5-4 (see map pocket). Few earthquakes capable of producing damage have originated in this region.

The seismically active region closest to the site is the Intermountain Seismic Belt of the Western United States, which extends in a northerly direction between Arizona and British Columbia. It is characterized by shallow earthquake foci between 10 and 25 mi in depth, and normal faulting. Part of this seismic belt extends along the Wyoming-Idaho border, more than 350 km (approximately 200 mi) west of the project area. More detailed information can be found in the report "Basic Seismological Characterization for Campbell County and Basic Seismological Characterization for Johnson County, Wyoming" by the Wyoming State Geological Survey.

Table JD-D5-1 lists the largest recorded earthquakes (greater than 4.0 magnitude on the Richter Scale) that have occurred within 200 km (120 mi) of the Jane Dough Unit site and gives the maximum ground acceleration that could be realized at the site as a result of these disturbances from the period 1873 through 2006 (Sources–Wyoming State Geological Survey, 2002 and USGS, 2007). The earthquake of highest intensity recorded during that time interval was the Casper, Wyoming earthquake of 1897. This earthquake has been assigned a probable maximum

Mercalli shaking intensity of VI -VII (5.7 on the Richter scale) based on accounts of damage incurred.

No surface faulting or fault traces in the project area has been reported, nor is any faulting evident from geophysical log interpretations. Based on historic data, the ground accelerations reported in Table JD-D5-1 (.01g to .04g) are not considered to be of a magnitude that would disturb the operations or facilities in the event that an earthquake occurred.

Table JD-D5-1

MAXIMUM EXPECTED EARTHQUAKES INTENSITIES AND GROUND ACCELERATIONS AT THE JANE DOUGH UNIT SITE

Earthquake Location and Year	Epicenter Intensity (Mercalli)	Magnitude (Richter)	Distance From Jane Dough Unit	Ground Acceleration at Jane Dough Unit
Casper (1894)	V	4.5	65	0.01g
Casper (1897)	VI-VII	5.7	64	0.04g
Kaycee (1965)	V	4.7	30	0.02g
Pine Tree Jct. (1967)	V	4.8	10	0.04g
West of Gillette (1976)	IV-V	4.3	38	0.02g
SW of Gillette (1976)	V	4.8	18	0.03g
Bar Nunn (1978)	V	4.6	56	0.01g
West of Kaycee (1983)	V	4.8	65	0.01g
West of Gillette (1984)	V	5.1	30	0.03g
West of Gillette (1984)	V	5	28	0.03g
Laramie Mtns (1984)	VI	5.5	95	0.01g
Mayoworth (1992)	V-VI	5.2	52	0.02g
W Converse Co. (1996)	IV-V	4.2	54	0.01g

outcrop area to the southwest. TDS concentrations near the outcrops have been reported to be <1,000 mg/l.

The Foxhills Sandstone exists below the base of the Lance Formation. Foxhills is mainly a fine to medium grain sandstone. The ground-water flow direction in the Foxhills would be expected to be to the north in this area based on a map presented in Whitehead, 1996. The TDS values varied from 2,230 to 4,800 mg/l from the drill stem test for the deep disposal well in the Nichols Ranch Unit. The TDS in the outcrop area to the southwest has been measured to be from 1,000 to >2,000 mg/l.

The Lewis Shale underlies the Foxhill aquifer and is mainly an aquitard. This shale contains some lenses of fine grained sandstone but is generally not a very significant producer of water. The water quality in the Lewis Shale would be expected to be very poor. TDS in the Lewis Shale is likely to exceed 5,000 mg/l in this area.

JD-D6.2.1 HYDROLOGIC SETTING AND WELL CONSTRUCTION

The Jane Dough Unit is located in the outcrop of the Wasatch Formation. The stratigraphy of the Wasatch at this site consists of alternating layers of sand and shale with lignite marker beds. The mineable ore exists in one sand member, designated as the A Sand at the Jane Dough Unit.

The aquifer and aquitard sequence at the project area is shown in Figure **JD-D6-3**. This shows labeled sands from the 1, A, B, C, F, G, and H Sands. This figure also shows the aquitards that exist between the different sands and those aquitards are labeled as by the combination of labels for the two adjacent sands. These sands are the same names that are used at Power Resources North Butte permit which exists just north of the Hank Unit site.

The majority of the wells completed in the Jane Dough Unit are completed in the A Sand because this is the ore bearing sand in this area. Figure JD-D6-4 shows the locations of the Jane Dough Unit wells and Exhibit JD-D6-1 shows the locations of wells within three miles of the Jane Dough Unit. Table JD-D6-2 presents the tabulation of the well data for the Jane Dough Unit wells. Table JD-D6-2 shows that eight of the wells have been completed in the A Sand for definition of baseline water level and water quality with four wells completed in the B Sand, one well in the C Sand, three wells in the F Sand, two wells in the G Sand, three in the 1 Sand. Three wells were completed in the Cottonwood, Dry Fork, and Seventeen Mile alluviums. All of these wells with the exception of URZJF-17 and the alluvial wells, URZJQ-24-1, URZJQ-25, and URZJQ-26, are open hole completed. Additional ranch wells, N1, Pats #1, and Pug #1, are presented in the table but not used for baselining. Addendum JD-D6L gives the Uranium Data Submission Spreadsheets which contain additional information on the wells.

JD-D6.2.2 SUMMARY OF AQUIFER AND AQUITARD PROPERTIES

Numerous single-well pump tests and multi-well pump tests were conducted at the Jane Dough Unit to define the aquifer properties. The detailed hydrologic analyses and supporting data are contained in Addendums JD-D6B and JD-D6C for the single-well and multi-well

The two single-well pump tests for the 1 Sand produced transmissivity values between 1.6 and 19.4 gal/day/ft. A value of 17.7 gal/day/ft is thought to be most representative of the 1 Sand in the Jane Dough Unit.

Three single-well pump tests were conducted in the F Sand and yielded a large range of transmissivity values. Transmissivities ranged from 7.6 to 4,440 gal/day/ft. A small transmissivity of 2.1 gal/day/ft and hydraulic conductivity of 0.01 ft/day were determined for the C Sand from the URZJC-10 single-well pump test.

JD-D6.2.2.2 AQUITARD PROPERTIES

The multi-well pump tests were used to define the confinement of the aquitards between the ore aquifer and the overlying and underlying aquifers. The URZJA-1, URZJA-7, and URZJA-8 multi-well pump test had no indication of connection between the A Sand and the underlying 1 Sand during this multi-well pump test. The URZJA-13-1 and URZJA-14-1 multi-well pump tests showed that no indication of connection between the A Sand and the overlying B Sand.

The most important parameter for confinement of the ore sand from the adjacent aquifers is the thickness of the aquitard. Experience has shown that the continuity of only a few feet of Powder River shale is needed to form an adequate confinement between the ore sand and adjacent aquifers. Exhibit **JD-D5-17** presents the aquitard thickness for the AB Mudstone. This isopach map shows that the thinnest location observed is in the eastern portion of the Jane Dough Unit. Exhibit **JD-D5-19** presents the aquitard thickness between the 1 and A Sands in the Jane Dough Unit area.

The vertical hydraulic conductivities of the aquitard in the Powder River Basin have been defined at numerous locations. These hydraulic conductivities have been measured in multi-well pump tests with the Neuman-Witherspoon (1972) method, determined from the results from the leaky aquifer pump test analysis with the modified Hantush (1960) method, and from laboratory measurements. This data has shown that the vertical hydraulic conductivity of these aquitards is low enough that site specific measurements of the aquitard hydraulic conductivity are not necessary. Aquitard hydraulic conductivity was measured in the area northeast of the Jane Dough Unit in Power Resources North Butte permit. This permit presents aquitards evaluated with the Neuman-Witherspoon field test for the CF aquitard between the F and C Sands. Table JD-D6-4 presents the North Butte aquitard properties. The vertical hydraulic conductivity of this material was 3.4E-8 cm/sec (3.5E-2 ft/yr). A second multi-well test at the North Butte site defined the 1A aquitard hydraulic conductivity between the A Sand and the 1 Sand. The results of this test were 4.1E-8 cm/sec (4.2E-2 ft/yr). Additional field tests were evaluated using the modified Hantush method to define the vertical hydraulic conductivity of the aquitard. These calculated hydraulic conductivities varied from a low of 6.7E-9 to a high of 6.9E-8 cm/sec (6.9E-3 to 7.1E-2 ft/yr). Laboratory hydraulic conductivities were also measured on two samples of the aquitards at the North Butte permit

Unit wellfields. Depths to water in the G Sand are 50 ft in the northern portion of the wellfields. The alluvial aquifers are important surficial aquifers outside of the wellfield areas.

Jane Dough Unit Aquitard Flow

Table JD-D6-5 presents the gradient calculations through the aquitards based on the heads in the adjacent aquifers and the thickness of the aquitard. The head in the A Sand is 3 ft higher than the head in the B Sand at the Jane Dough Unit at well URZJA-20. These head differences indicate a gradient of 0.15 ft/ft across the 20 ft of aquitard at this location. The actual gradient in the aquitard is expected to be mainly controlled by the higher head in the A Sand and therefore, based on observation of head measurements in aquitards in the Powder River Basin the actual gradient in the overlying aquitard at the Jane Dough Unit is likely to be roughly 0.1 ft/ft. The head in the underlying aquifer 1 Sand in this location is approximately 15 feet higher than the head in the A Sand, therefore, an upward gradient exists between the A Sand and the underlying 1 Sand. This indicates a gradient across the aquitard of approximately -0.24 ft/ft. The higher head in the 1 Sand is expected to mainly control the head in the aquitard until within a very few feet adjacent to the A Sand.

JD-D6.2.3.1 JANE DOUGH UNIT WATER LEVEL CHANGES

The water-level elevations have been measured on the Jane Dough Unit wells and are presented in Addendum JD-D6D. Table JD-D6D.1-1 in Addendum JD-D6D presents the water-level data tabulation for the Jane Dough Unit. Figures JD-D6D.1-1 through JD-D6D.1-5 in Addendum JD-D6D present the water-level elevations; versus time for the Jane Dough Unit wells. Water-levels for the A Sand wells since 2010 have been fairly steady with a very gradual decrease observed in 2012 and 2013.

Water levels in the northwest cluster of the Jane Dough Unit all show a very slight decrease in water level over the last two years. B Sand well URZJB-3 has had very similar water levels to A Sand wells URZJA-1 and URZJA-2 up until the beginning of 2013. **Water-level in** the underlying 1 Sand is roughly 18 ft above the A Sand in this cluster. The F Sand, as shown by the URZJF-5, water levels in this cluster is slightly over 15 ft lower than the A Sand.

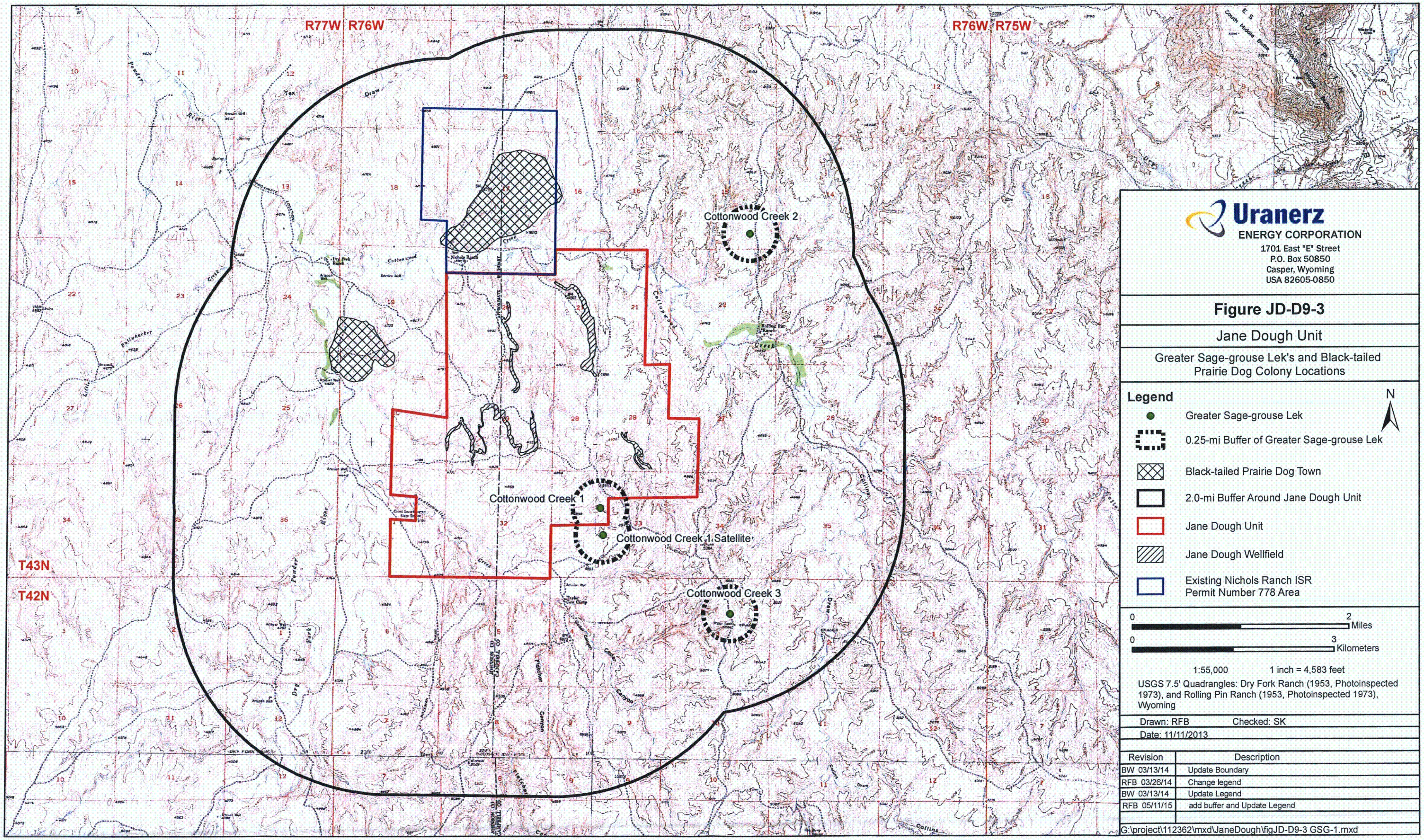
The A and B Sand water levels in the southeast cluster have very similar water levels. The AB mudstone is not continuous on the eastern portion of the Jane Dough Unit; hence, the similar heads in the adjacent aquifers. The 1 Sand water level is over 35 ft higher than that of the A Sand. The C Sand, as shown by well URZJC-10, water-level is roughly four feet higher than the A Sand. The most surficial aquifer, the G Sand, shows a water level nearly 30 ft higher than the A Sand.

The A Sand wells in the southwestern cluster show a slight increase in water level in 2013. The overlying B and F Sands both have water levels over 20 ft lower than the A Sand in this area.

A reasonable inspection of the project area showed that these abandoned holes were marked with a stake or pin flag after plugging was completed. To the best of Uranerz Energy Corporations knowledge all holes drilled prior to 1997 were sealed and surface plugged in compliance with the State of Wyoming regulations in effect at the time of drilling. Additionally, visual inspection conducted during current drilling and reclamation operations from 2006 through 2013 in the two permit areas have found no historic drill holes that were not abandoned properly. Also there has not been any evidence of historic drill holes causing cross contamination between aquifers when conducting pump tests or when reviewing historic versus current water levels and water quality in monitor wells that are present in the permit areas. Furthermore, since the historic drill holes have been released by the WDEQ, an assumption can be made that the holes were properly abandoned according to the rules and regulations in place at the time the drill holes were abandoned. No problems are anticipated with past abandoned drill holes.

All known abandoned drill holes are listed in Tables JD-D6I.1-1 and JD-D6I.1-2. The first letters of the drill holes (historic and current) denote the company that drilled the hole as seen after the company name in the previous paragraph. The location and density of all drill holes is shown on Exhibit JD-D6-4.

Abandonment methods used for exploration holes drilled prior to 1997 were sealed and surface plugged in compliance with the State of Wyoming regulations in effect at the time of drilling. The methods utilized prior to 1997 mostly consisted of drilling and abandoning drill holes with drill and natural mud. No additional materials were added to increase the solids or viscosity. After 1977 bentonite was added if needed in abandoning drill holes. Drill holes abandoned by this method are denoted by a "1" in Table JD-D6I.1-2. Drill holes that have a "2" are denoted for abandonment method in Table JD-D6I.1-1 and JD-D6I.1-2 have been abandoned in accordance to current Wyoming Statue §35-11-404 and Wyoming Department of Environmental Quality – Land Quality Division (WDEQ-LQD) Noncoal Rules and Regulations, Chapter 8. These drill holes are abandoned by sealing the drill hole with additional high solids (fortified) bentonite circulated at total depth or abandonment muds as specified in Wyoming Statue §35-11-404 and Chapter 8 of the WDEQ LQD Noncoal Rules and Regulations. All drill holes were surface sealed and marked for identification.



R77W R76W
R76W R75W
T43N
T42N
Cottonwood Creek 2
Cottonwood Creek 1
Cottonwood Creek 1 Satellite
Cottonwood Creek 3
Uranerz
ENERGY CORPORATION
1701 East "E" Street
P.O. Box 50850
Casper, Wyoming
USA 82605-0850
Figure JD-D9-3
Jane Dough Unit
Greater Sage-grouse Lek's and Black-tailed Prairie Dog Colony Locations
Legend
Greater Sage-grouse Lek
0.25-mi Buffer of Greater Sage-grouse Lek
Black-tailed Prairie Dog Town
2.0-mi Buffer Around Jane Dough Unit
Jane Dough Unit
Jane Dough Wellfield
Existing Nichols Ranch ISR Permit Number 778 Area
N
0 2 Miles
0 3 Kilometers
1:55,000
1 inch = 4,583 feet
USGS 7.5' Quadrangles: Dry Fork Ranch (1953, Photoinspected 1973), and Rolling Pin Ranch (1953, Photoinspected 1973), Wyoming
Drawn: RFB
Checked: SK
Date: 11/11/2013
Revision
Description
BW 03/13/14 Update Boundary
RFB 03/26/14 Change legend
BW 03/13/14 Update Legend
RFB 05/11/15 add buffer and Update Legend
G:\project\112362\mxd\JaneDough\figJD-D9-3 GSG-1.mxd

To illustrate, the first and third quarter averages for all five monitoring locations at the Hank and Nichols Ranch Units are summarized as follows.

Radon-222 Quarterly Averages: Hank Unit and Nichols Ranch Unit

Hank Unit	**Nichols Ranch Unit**
1st Quarter: 0.6 pCi/l	1st Quarter: 0.8 pCi/l
3rd Quarter: 1.9 pCi/l	3rd Quarter: 1.4 pCi/l

Table JD-D11-6 Baseline Radon-222 at the Jane Dough Unit.

	Third Quarter 2010 (pCi/l)	**Fourth Quarter 2010** (pCi/l)	**First Quarter 2011** (pCi/l)	**Second Quarter 2011** (pCi/l)	**Average by Site** (pCi/l)
JD-1	1.0 +/- 0.09	0.6+/-0.05	0.3 +/-0.04	0.6 +/-0.05	**0.6**
JD-2	1.2 +/-0.10	0.5+/-0.05	0.3 +/-0.04	0.7 +/-0.06	**0.7**
JD-3	0.7 +/-0.07	0.6+/-0.06	0.3 +/-0.04	0.6 +/-0.05	**0.6**
JD-4	0.6 +/-0.07	0.7+/-0.06	0.5 +/-0.05	0.4 +/-0.04	**0.6**
JD-5	1.0 +/-0.09	0.6+/-0.05	0.4 +/-0.04	0.6 +/-0.05	**0.7**
JD-6/NR-2*	1.1 +/-0.09	0.6+/-0.06	0.3 +/-0.04	0.7 +/-0.06	**0.7**
JD-7/NR-1*	1.1 +-/0.10	0.8+/-0.07	0.3 +/-0.04	0.5 +/-0.05	**0.7**
Average	**1.0**	**0.6**	**0.3**	**0.6**	

Notes: *Nearest residence upwind and downwind.
U.S. average outdoor Rn-222 level: 0.4 pCi/l (U.S. EPA).

Although the second quarter average at the Nichols site was slightly higher than the third quarter (1.6 pCi/l vs.1.4 pCi/l), a sample location in the second quarter had a single high value of 2.3 pCi/l which raised the average. If the value had been closer to the values of 0.6 pCi/l and 1.4 pCi/l that were measured at that location during other quarters, the third quarter average would have been the highest as is was at Hank and Jane Dough. The apparent cycle of higher values occurring in the third quarter and the lower values in the first quarter could likely be the result of weather conditions. The first quarter is usually the months of colder weather with snow cover which adds another barrier; whereas the third quarter is generally the months of warmer and drier weather. The colder months tend to suppress radon exhalation rates, while the warmer months tend to increases the emanation rate. In addition, radon exhalation rates fluctuate with wet and dry soil conditions and with changes in vegetative cover. This explanation is further supported by the fact that highest and lowest values are not found at a single site; instead, the highest and lowest values vary with the time of year.Table JD-D11-6 also shows the annualized average for all locations combined as being 0.6 pCi/l. This average is lower than the averages of 1.0 pCi/l and 1.2 pCi/l recorded at the Hank and Nichols Ranch Units, respectively. The range of the averages at all three units are consistent with values found in the U.S. Background radon varies considerable in the U.S. due to factors such as soil and rock types and the presence of naturally occurring uranium. The 0.6 pCi/l average measured at the Jane Dough Unit is consistent with but slightly above the U.S. average outdoor Rn-222 level of 0.4 pCi/l (U.S. EPA).

JD-D11.3.3 Background Gamma Exposure Rate

Background gamma exposure rates from the one year monitoring program are summarized in Table JD-D11-7. The quarterly average for all seven sites ranged from 35.0 mrem (first quarter 2011) to 45.8 mrem (fourth quarter 2010). When compared to previous baseline surveys at the Hank Unit and Nichols Ranch Unit, the quarterly averages for all monitoring locations ranged from 34.4 mrem to 55.0 mrem (Hank) and 35.0 mrem to 47.9 mrem (Nichols Ranch). An additional comparison can be made to values from an even earlier baseline that was developed for the nearby North Butte project. The quarterly averages from North Butte ranged from 32.3 mrem to 39.7 mrem.

Apart from the comparisons just noted, the average values **(38.3, 42.5, and 45.4 mrem)** recorded **at** the three project sites can be put into a better perspective when compared to the following:

- Average dose to the U.S. Public from natural sources: 300 mrem/year.
- Background radiation (total) in the Colorado Plateau: 75 to 140 mrem/year.
- Terrestrial background (Rocky Mountains): 40 mrem/year.
- Average dose to the public from all sources: 360 mrem/year

As the comparison shows, the average background at the project site is very similar to terrestrial background **presented for the** Rocky Mountains.

Table JD-D11-7 Baseline Gamma Exposure Rate at the Jane Dough Unit Air Monitoring Stations.

Sample Site	**Third Quarter 2010 (mrems)**	**Fourth Quarter 2010 (mrems)**	**First Quarter 2011 (mrems)**	**Second Quarter 2011 (mrems)**	**Average by Site (mrems)**
JD-1	34.7	45.0	36.2	44.5	**40.1**
JD-2	38.8	45.1	34.3	38.0	**39.1**
JD-3	33.9	46.9	35.6	34.0	**37.6**
JD-4	30.8	42.7	33.0	34.7	**35.3**
JD-5	35.0	45.9	30.2	33.0	**36.0**
JD-6/NR-2*	37.4	49.4	38.8	38.4	**41.0**
JD-7/NR-1*	36.2	45.7	37.2	38.0	**39.3**
Jane Dough (Avg.)	**35.3**	**45.8**	**35.0**	**37.2**	**38.3**
Nichols Ranch (Avg.)	**39.6**	**35.0**	**47.5**	**47.9**	**42.5**
Hank Unit (Avg.)	**41.5**	**34.4**	**55.0**	**50.5**	**45.4**

Notes: *Nearest residence upwind and downwind.
Minimum detectable dose equivalent: 0.10 mrem

Uranerz
ENERGY CORPORATION

June 15, 2015

Mr. Dorran Larner
Department of Environmental Quality – Land Quality Division
2100 West 5th Street
Sheridan, WY 82801

RE: TFN 5 5/166, Uranerz Energy Corporation, Nichols Ranch ISR Project, Permit to Mine No. 778
Jane Dough Amendment, Round 1 Technical Comments

Dear Mr. Larner,

Uranerz Energy Corporation (Uranerz) submitted responses to Round 1 Technical Comments on June 10, 2015. WDEQ-LQD indicated, via email, that Figures JD-D5-a and JD-D5-b were missing. It was also indicated that page MP-41 was missing; however, upon review the page was not needed for this submittal and the Index of Change has been corrected to reflect that. Uranerz appreciates WDEQ-LQD's notification regarding these pages. Enclosed please find the 2 figures along with the corrected Index of Change.

If there are any questions regarding the Nichols Ranch ISR Project, Jane Dough Amendment submittal, please contact me at the Casper office at 307-265-8900 or by email at mthomas@uranerz.com.

Sincerely,

Michael P. Thomas
Vice President, Regulatory and Public Affairs
Uranerz Energy Corporation

MT/dk

Enclosures: Revised pages & Index of Change

cc: David Brown, NRC

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INDEX SHEET FOR MINE PERMIT AMENDMENTS OR REVISIONS

Date 6/10/15
TFN 5 5/166
PERMIT NO.: 778

MINE COMPANY NAME: Uranerz Energy Corporation
MINE NAME: Nichols Ranch ISR Project

Statement: I, Michael P. Thomas, an authorized representative of Uranerz Energy Corporation declare that only the items listed on this and all consecutively numbered Index Sheets are intended as revisions to the current permit document. In the event that other changes inadvertently occurred due to this revision, those unintentional alterations will not be considered approved. Please initial and date. ____________________

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Volume Number	Page, Map or other Permit Entry to be REMOVED	Page, Map or other Permit Entry to be ADDED	Description of Change
Jane Dough Amendment Volume VII	Mine Plan: Section 3.1.1, pg MP-7	Mine Plan: Section 3.1.1, pg MP-7	Pg. MP-7 was revised to correct a reference per LQD comment.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.1.1.2 and 3.1.1.2.2, pg. MP-8, MP-8c, and Figure 3-1	Mine Plan: Section 3.1.1.2 and 3.1.1.2.2, pg. MP-8, MP-8c, and Figure 3-1	These pages and figure were revised and approved into the current permit under Change No. 11 (TFN 6 4/112) and need to be incorporated into the JD amendment documents.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.3.1, pg MP-10	Mine Plan: Section 3.3.1, pg. MP-10	Section 3.3.1, pg MP-10 was revised to include flow and production rate at Jane Dough per LQD comment.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.3.2, pg MP-10a	Mine Plan: Section 3.3.2, pg MP-10a	Section 3.3.2, pg MP-10a was revised to correct the bolded word Nichols Ranch to Jane Dough per LQD comment.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.3.5, pg MP-12a	Mine Plan: Section 3.3.5, pg MP-12a	Section 3.3.5, pg MP-12a bolded sentence was revised to say that if any line breaks it will be taken care of appropriately.
Jane Dough Amendment Volume VII	Mine Plan: Sections 3.5.3 and 3.5.4, pg. MP-19, Figure 3-11	Mine Plan: Section 3.5.3, pg MP-19 and Figure 3-11	Pg MP-19 was revised to correct for three units in Sections 3.5.3 and 3.5.4. Figure 3-11, referenced in Section 3.5.3, was updated. This figure is located at the end of the Mine Plan document with the other figures.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.6, pg. MP-20	Mine Plan: Section 3.6, pg. MP-20	Pg. MP-20 was revised to account for monitor wells per LQD comment.
Jane Dough Amendment Volume VII	Mine Plan: Table of Contents pg MP-viii	Mine Plan: Table of Contents pg MP-viii	The page was revised and approved into the current permit under Change No. 14 (TFN 6 3/147) and need to be incorporated into the JD amendment documents.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.10.1, pgs. MP-25 and 25a, Figures 3-12A and 3-12B	Mine Plan: Section 3.10.1, pgs. MP-25, 25a and 25b, Figures 3-12A and 3-12B	The pages and figures were revised and approved into the current permit under Change No. 14 (TFN 6 3/147) and need to be incorporated into the JD amendment documents.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.12, pg. MP-31a	Mine Plan: Section 3.12, pg. MP-31a	Pg. MP-31a was revised to include a discussion regarding subsidence in response to LQD comment. A reference has also been added on this page to point to the Reclamation Plan for the discussion of erosion controls.

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Volume Number	Page, Map or other Permit Entry to be REMOVED	Page, Map or other Permit Entry to be ADDED	Description of Change
Jane Dough Amendment Volume VII	Mine Plan: Section 3.13.2.2.2, pg. MP-36, Figure 1-5	Mine Plan: Section 3.13.2.2.2, pg. MP-36, Figure 1-5	Pg. MP-36 was revised to include a reference to Figure 1-5 per LQD comment. Figure 1-5 has also been updated and revised. This figure is located at the end of the Mine Plan document with the other figures.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.13.4, pg. MP-37	Mine Plan: Section 3.13.4, pg. MP-37	Pg. MP-37 was revised to include a reporting commitment per LQD comment.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.14.1.1, pgs. MP-39-40a and Figure 3-18	Mine Plan: Section 3.14.1.1, pgs. MP-39-40a and Figure 3-18	These pages represent changes approved under permit 778 Change No. 12 (TFN 6 5/124) and Change No. 13 (TFN 6 1/166) and need to be incorporated into the JD amendment to maintain consistency between the approved permit and the amendment document.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.14.7.8.10.3, pg. MP-73	Mine Plan: Section 3.14.7.8.10.3, pg. MP-73	Pg. MP-73 was revised to include a reporting commitment per LQD comment.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.15.1, pg. MP-73a	Mine Plan: Section 3.15.1, pg. MP-73a	Pg. MP-73a has been revised to include a reference to a figure.
Jane Dough Amendment Volume VII	Mine Plan: Section 3.15.2.7, pg. MP-77	Mine Plan: Section 3.15.2.7, pg. MP-77	Pg. MP-77 was revised per LQD comment
Jane Dough Amendment Volume VII	Mine Plan: Section 3.19, pg, MP-84b	Mine Plan: Section 3.19, pg, MP-84b	Pg. MP-84b was revised to include a reporting commitment per LQD comment.
Jane Dough Amendment Volume VII	Mine Plan: Addendum MP-I	Mine Plan: Addendum MP-I	The Addendum MP-I is being replaced in its entirety and includes 6 additional figures
Jane Dough Amendment Volume VII	Mine Plan: Addendum MP-C letter from Wyoming Game and Fish	Mine Plan: Addendum MP-C "Reserved"	The letter has been removed from this Addendum and placed in Appendix JD-D9, Addendum JD-D9-A.
Jane Dough Amendment Volume VII	Reclamation Plan: Section 3.2.1 and 3.2.2, pg. RP-15	Reclamation Plan: Section 3.2.1 and 3.2.2, pg. RP-15	The sections were revised to provide a reference regarding roads per LQD comment.
Jane Dough Amendment Volume VII	Reclamation Plan: Section 3.3, pg. RP-17	Reclamation Plan: Section 3.3, pg. RP-17	The section and page have been revised to provide a reference to where the discussion of subsidence is located.

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Jane Dough Amendment Volume VII	Reclamation Plan: Table of Contents pg. RP-iii	Reclamation Plan: Table of Contents pg. RP-iii	The pages were revised to incorporate changes from TFN 6 4/097.
Jane Dough Amendment Volume VII	Reclamation Plan: Section 3.6, pg. RP-19, 20, 20a	Reclamation Plan: Section 3.6, pg. RP-19, 20, 20a	The pages were revised to incorporate changes from TFN 6 4/097 Change No. 15.
Jane Dough Amendment Volume II	Appendix JD-D5	Appendix JD-D5	The Appendix narrative is being replaced in its entirety. Specially, the following changes were made. Pg JD-D5-1 is being replaced to correct for typographical errors. Pg JD-D5-9 was revised per LQD comment regarding pump test times for various wells. Figure JD-D5-a is being replaced to correct a typographical error. Figure JD-D5-b was revised to illustrate a shaded area. Sections JD-D5.3 Site Geology, subsection Jane Dough Uranium Deposition was revised per NRC discussion of the information.
Jane Dough Amendment Volume III		Appendix JD-D5, Exhibits JD-D5-21 through JD-D5-26	Exhibits JD-D5-21 through JD-D5-26 are new exhibits to go with the revised JD-D5 text as per discussion and submittal to NRC.
Jane Dough Amendment Volume IV	Appendix JD-D6, Section JD-D6.2.1, Pg. JD-D6-4	Appendix JD-D6, Section JD-D6.2.1, Pg. JD-D6-4	Pg JD-D6-4 was revised to correct a figure reference
Jane Dough Amendment Volume IV	Appendix JD-D6, Section JD-D6.2.2.2, Pg JD-D6-6	Appendix JD-D6, Section JD-D6.2.2.2, Pg JD-D6-6	Pg. JD-D6-6 was revised to correct figure references
Jane Dough Amendment Volume IV	Appendix JD-D6, Section JD-D6.2.3.1, Pg. JD-D6-9	Appendix JD-D6, Section JD-D6.2.3.1, Pg. JD-D6-9	Pg. JD-D6-9 was revised per LQD comment
Jane Dough Amendment Volume IV	Appendix JD-D6, Section JD-D6.5, Pg. JD-D6-20	Appendix JD-D6, Section JD-D6.5, Pg. JD-D6-20	Pg. JD-D6-20 was revised to remove a sentence not relevant to the discussion – per LQD comment.

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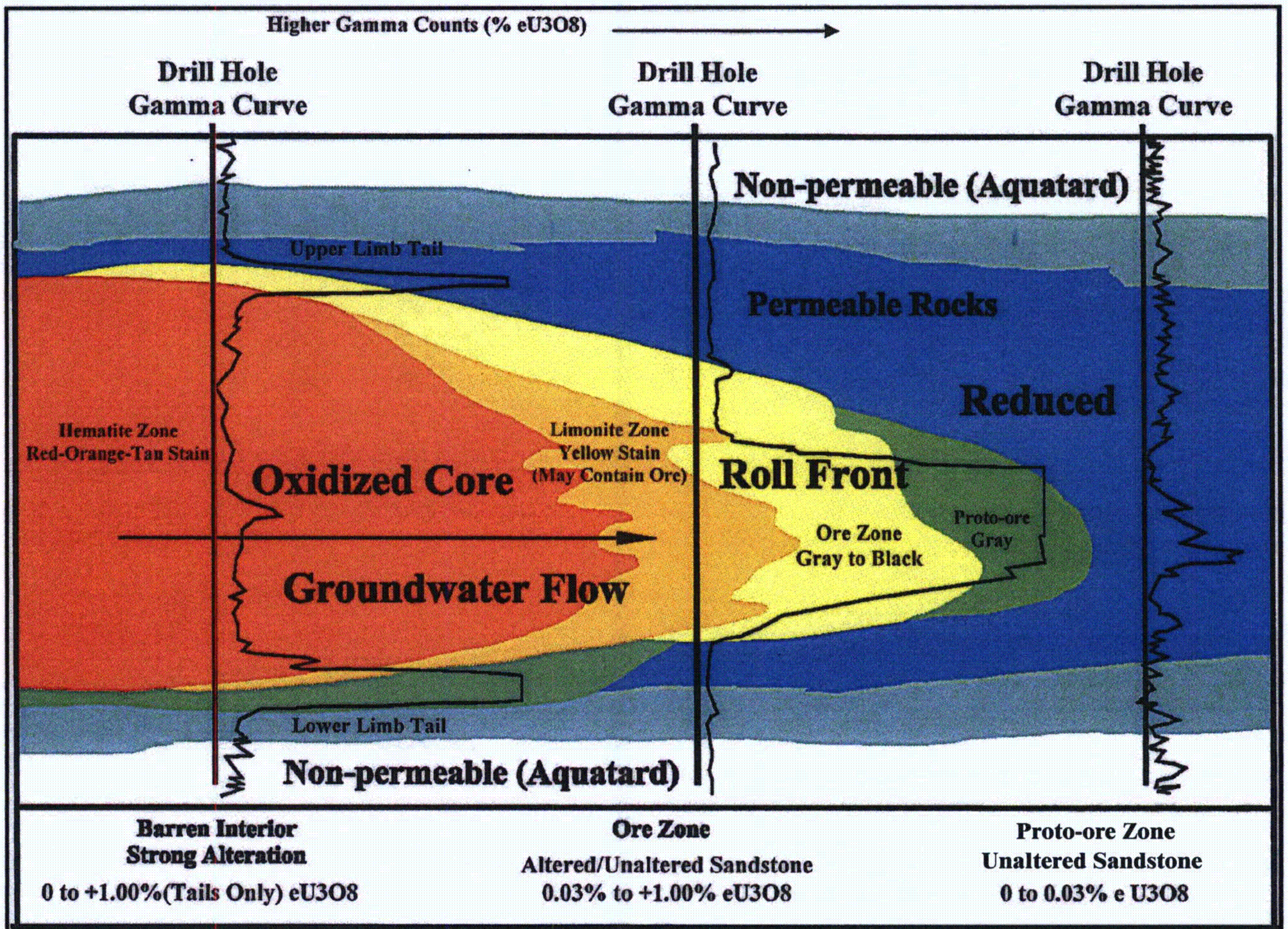
Jane Dough Amendment Volume VI	Figure JD-D9-3	Figure JD-D9-3	Figure was revised to provide buffer per LQD comment.
Jane Dough Amendment Volume VI	Appendix JD-D11, Section JD-D11.3.2, Pg. JD-D11-7	Appendix JD-D11, Section JD-D11.3.2, Pg. JD-D11-7	Pg. JD-D11-7 is being replaced as Table JD-D11-6 was revised to correct sampling dates.
Jane Dough Amendment Volume VI	Appendix JD-D11, Section JD-D11.3, pgs. JD-D11-18 and JD-D11-19	Appendix JD-D11, Section JD-D11.3, pgs. JD-D11-18 and JD-D11-19	Pages were revised for narrative changes as well as corrected data on Table JD-D11-7



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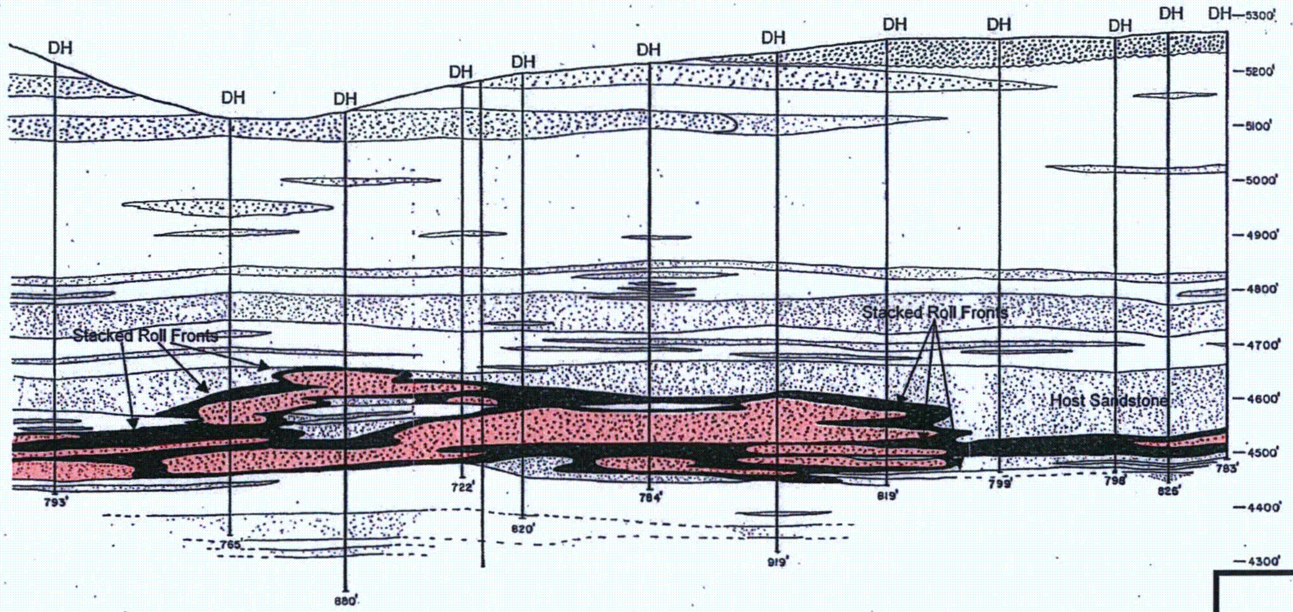
JANE DOUGH UNIT
FIGURE JD-D5-a
POWDER RIVER BASIN URANIUM ROLL FRONT

By: S.M.F.	Date: 04-08-2008
Datum: NAD27 UTM13	Revision Date: 2-18-2014
Scale: N.T.S.	Contour Interval: N/A
DWG#:	Exhibit Number:

Diagrammatic Cross Section - Stacked Roll Fronts
Powder River Basin



DH – Drill Hole

U-MINERALIZATION

OXIDIZED SANDSTONE

REDUCED SANDSTONE

INTERBEDDED SILTSTONE AND CLAYSTONE WITH MINOR SANDSTONE LENSES (Aquitards)

ALLUVIUM, LANDSLIDE DEBRIS, ETC.

Note: Migration of the roll fronts was perpendicular to the strike of the cross section

Horizontal scale 2X Vertical scale

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JANE DOUGH UNIT
FIGURE JD-D5-b
STACKED ROLL FRONTS

By: S.M.F.	Date: 04–08–2008
Datum: NAD27 UTM13	Revision Date: 2-18-2014
Scale: N.T.S.	Contour Interval: N/A
DWG#:	Exhibit Number: